SOCIAL SCIENCES CHEMICAL RESEARCH
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INDUSTRIAL MEDICINE

The Journal of Occupational Diseases and Traumatic Surgery

November, 1941

Arteriosclerotic Vascular Disease
— An Introduction —

Esophageal Hiatus Hernia
— Not Uncommon; Still Under-diagnosed —

Cooling Workers
— in Hot Industry —

Trends
— in Occupational Disease and Industrial Hygiene —

Railway Surgery
— Annual Meeting in Abstract —

Health, Hygiene and Nursing
— Thirtieth National Safety Congress —

Medical Service
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Volume 10 Number 11

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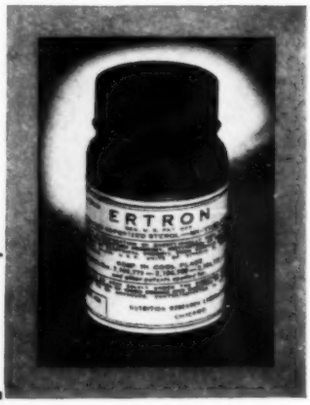

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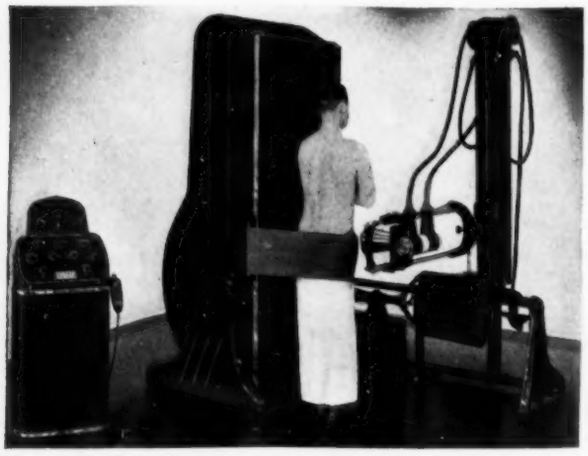

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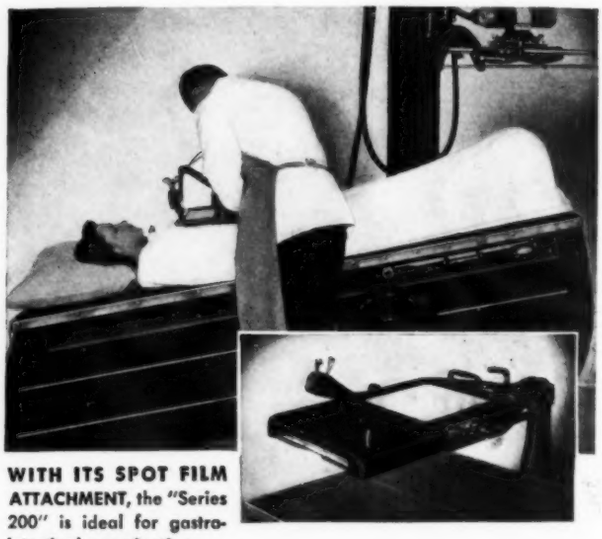

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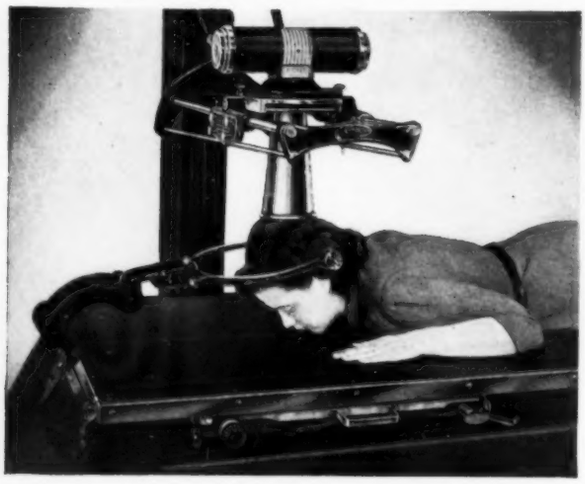

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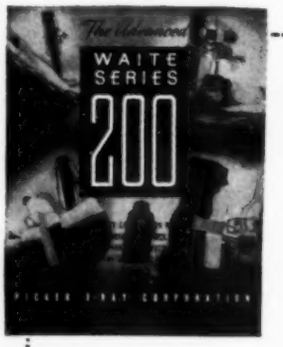

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INDUSTRIAL MEDICINE
& RAILROAD SURGERY

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RAILWAY SURGERY," beginning on page 469, is the Fifty-Second Annual Meeting of the AMERICAN ASSOCIATION OF RAILWAY SURGEONS in a sequence of abstracts, most of which were prepared by the authors themselves. Some are so carefully and comprehensively developed as to be effective substitutes for the full texts of the presentations. This is particularly valuable as to those which were largely from notes. The whole is a panorama of industrial medicine and surgery which more than sustains our statements in advance that this program was preeminently outstanding. DR JOHNSON'S "Arteriosclerotic Vascular Disease" (page 453) is the complete text, with the most important of the illustrations. DR. GILBERT'S "Esophageal Hiatus Hernia" (page 457) is also the complete text. The presentations by DRS. GURDJIAN, FEIL, WRIGHT and DECKER were published in full in INDUSTRIAL MEDICINE for October . . . . DR. FERDERBER and his associates have a live subject in "Cooling Workers in Hot Industry" (page 460). It is a "hot" subject, indeed, and the defense program is making it hotter . . . . DR. HAYHURST, in his review of Standard Oil's *Medical Bulletin* (page 464) cites the publication as "a leading example of how several industries are analyzing themselves in the field of industrial medicine and health economy, at the same time freely publicizing their findings so that good may redound universally" . . . . WALTER H. EDDY, whose

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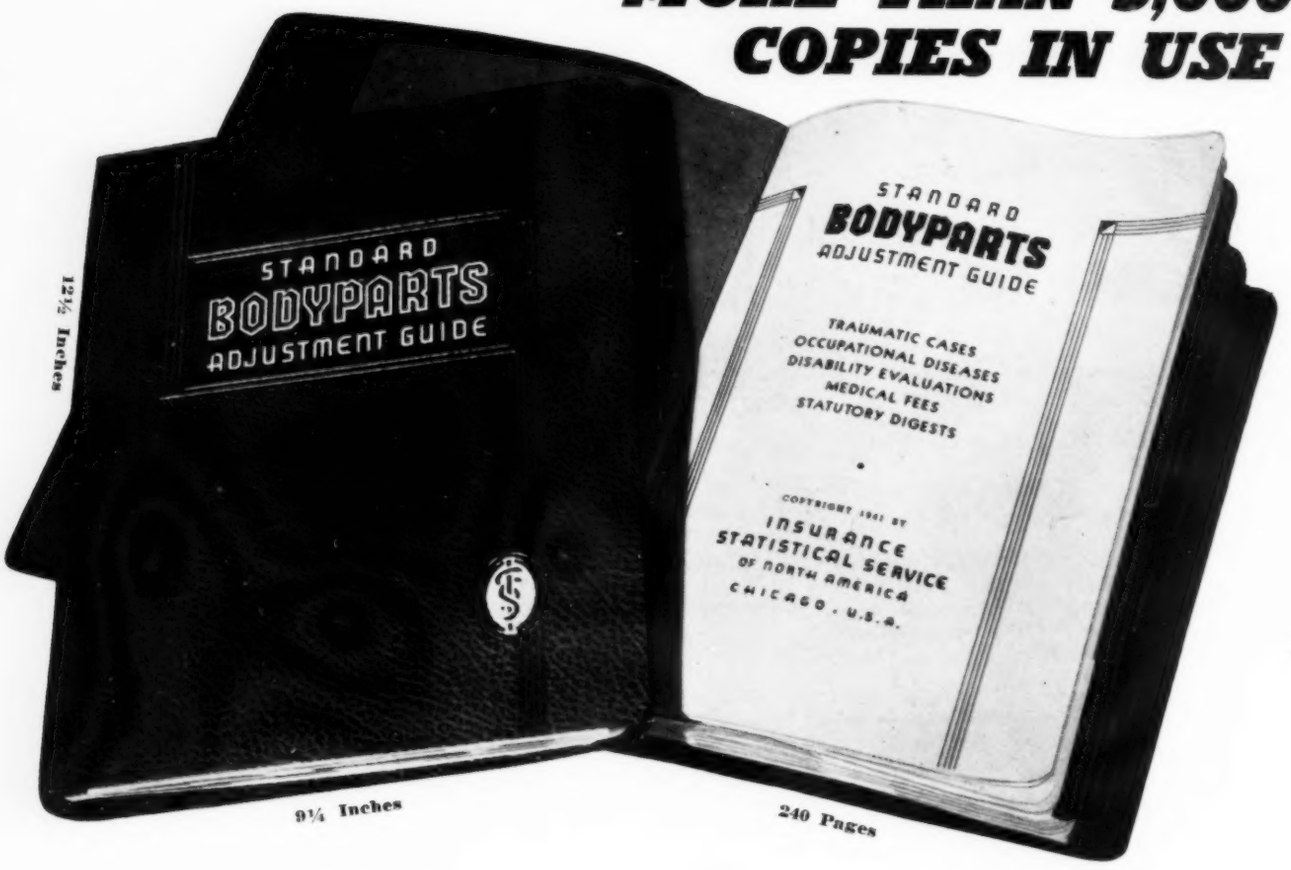

Publisher's Statement

THE Medical Fees listed in Standard Bodyparts Adjustment Guide represent a COMPOSITE COAST TO COAST AVERAGE of published fee schedules, which, varying greatly in their coverage of professional services likely to be rendered in conjunction with workmen's compensation cases, are necessarily supplemented in some instances by personalized information and valued estimates, with the result that the schedules herein listed constitute an authoritative survey of the medical, surgical and laboratory fees being charged for similar services throughout the United States.

The Disability Schedules are an average of the best figures available, averaged with the estimates of industrial surgeons and other specialists—the resulting average being a composite estimate.

The Evaluation Section is based upon the best medical material available and offers in condensed form a standardized evaluation method for appraising the various types of loss-of-use conditions, which exist outside of published disability schedules.

The Dental Fee Schedules incorporated in Standard Bodyparts Adjustment Guide are an exact reproduction of the schedules in use in nine individual states, wherein dental services are listed in detail. The listings of the nine states are preserved intact, without attempting to average available schedules (as elsewhere in the Guide), because of: (1) the desire of the Publisher to present the available dental fees "side by side" for purposes of comparison; and (2) the hesitancy of the Publisher to delete pertinent parentheses and explanatory comment from the individual state schedules.

Average Figures. The ADJUSTER, CLAIM OFFICIAL, LAWYER and PHYSICIAN should appreciate that the figures contained in Standard Bodyparts Adjustment Guide are a general average, subject to variation and revision for any individual case.

Subject-Matter. The text-material, charts and schedules embodied in Standard Bodyparts Adjustment Guide are offered to all those interested in LIABILITY and WORKMEN'S COMPENSATION CASES as a helpful estimate and guide, based upon the best information obtainable; however, the Publisher assumes no liability for the verification of any material contained in the Guide.

Illustrative Art Work. The skeleton, muscle, nerve, circulatory, thoracic and abdominal viscera, head, eye, ear, nose, throat and teeth illustrations are the famous Frohse Anatomical Charts. The designating key-numbers, referring to the Latin and English definitions were especially grouped for Standard Bodyparts Adjustment Guide, so as to facilitate a comparison of the various parts of the body. The cover design and bone illustrations are original drawings, prepared for this volume by Joseph C. Sewell. The hernia and traumatic eye illustrations are also original drawings, prepared for this volume by Ralph V. McCarthy.

Appearance. A preconceived effort has been made to produce a volume of attractive appearance and convenient size, the loose-leaf arrangement being permissive of periodic extension and revision.

Publisher's Acknowledgment. The Publisher hereby acknowledges with appreciation the co-operative assistance rendered by:

(1) the American Medical Association, the American Osteopathic Association and the American Dental Association, in supplying valuable factual data through their respective Departments of Economics;

(2) the American College of Surgeons, in making available certain material by courtesy of its librarian;

(3) the various Industrial Commissions or Boards, in furnishing source material and helpful comment as to the practical operation of local workmen's compensation (and occupational disease) statutes; and

(4) the Division of Standards, U. S. Department of Labor, in providing data relative to all phases of prevalent workmen's compensation systems.

In addition to the organizations mentioned above, the Publisher has had the advice and counsel of competent lawyers; insurance executives; claim officials; medical specialists; and active practitioners, so that the Guide never loses sight of a decidedly practical viewpoint.

THIS SERVICE ANSWERS HUNDREDS OF EVERY DAY QUESTIONS ON TRAUMATIC CASES, OCCUPATIONAL DISEASES, DISABILITY EVALUATIONS, MEDICAL FEES AND STATUTORY MATTERS . . . .

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INTRODUCTION TO THE BODY

ILLUSTRATIONS, KEYED TO LATIN AND ENGLISH DEFINITIONS: skeleton, front and back view; muscular system, front and back view; circulatory system; nervous system; thoracic and abdominal viscera in situ; deeper dissection of thoracic and abdominal viscera; still deeper dissection of thoracic and abdominal viscera; deepest dissection of thoracic and abdominal viscera.

DESCRIPTION OF BODY FUNCTIONS: bones of the body; spinal column; cranium, face; thorax; clavicle, scapula; upper, lower arm; lower extremities; types of joints; ligaments, membranes, bursae; muscular system; nervous system; digestive system; abdomen, intestines; circulatory system; respiratory function; organs of excretion.

MEDICAL FEES

DIGEST OF STATE REQUIREMENTS: digested for physicians and others; who render service under compensation acts.

COMPOSITE COAST TO COAST AVERAGE: (Minimum-Maximum-Mean Average) Physicians' (M.D.) Fees; Surgeons' Fees; Physicians' (D.O.) Fees; Orthopedists' Fees: Laboratory Fees; X-ray Fees; Therapy Fees.

EYE—EAR—NOSE—THROAT AND DENTAL FEES

ILLUSTRATIONS KEYED TO LATIN AND ENGLISH DEFINITIONS: Head, median section view; Eye, Horizontal section; Posterior half; Anterior half; Ear, external and internal view; Nose, cross-section interior; Throat, horizontal section; Neck, coronial section; Teeth, lateral view uppers and lowers; Mouth, cavity view; traumatic eye illustrations; SPECIALIZED SERVICE FEES.

TRAUMATIC CASES

ILLUSTRATIONS: vertebral column; skull, front and side views; trunk, side and back views; humerus, four views; radius and ulna, four views; shoulder joint, front and back views; elbow joint, two views; pelvis, female, front, back and side views; pelvis, male, front, back and side views; femur and patella views; tibia and fibula views; hip joint, front and back views; knee joint, front and side views; hand, palmar and back views; foot, side, back, top and bottom views.

MISCELLANEOUS TRAUMATIC CASES: disabling low back conditions; hernia; inguinal hernia in the male; posterior aspect of anterior abdominal wall; anterior abdominal wall viewed from within—situs of herniae; injuries and infections of the hand, burns and scalds.

DISABILITY DESCRIPTIONS: immobilization periods; observation periods; unemployable periods; settlement bases.

INCIDENTAL DISABILITIES: superficial and minor injuries.

OCCUPATIONAL DISEASES

DISEASES ATTRIBUTABLE TO INDUSTRY: occupational poisons; types of diseases; occupational exposures; industrial hazards; signs and symptoms.

COMPREHENSIVE SUMMARY.

EVALUATION

TECHNIQUE OF EVALUATION: purposes of evaluation; necessity for evaluation.

STAGES OF DISABILITY: temporary partial; temporary total; permanent partial; permanent total.

TABULAR DATA: classification of compensable injury cases; percentages of permanent partial disability (by ages); fixed values for partial disability.

FUNCTIONAL CAPACITY APPROACH TO EVALUATION

EVALUATION OF ANKYLOSIS

EVALUATION OF FRACTURES: sample evaluation of humerus.

EVALUATION OF MUSCLES AND NERVES

EVALUATION OF EYE, EAR, HERNIA

EVALUATION OF OCCUPATIONAL DISEASES

COMPENSATION

WORKMAN'S COMPENSATION ACTS, EMPLOYERS' LIABILITY: Legislative background; Administration of the Acts.

COMPENSATION AND INSURANCE SYSTEMS: types of recognized disabilities; insurance systems by states.

DIGEST OF STATE PROVISIONS: scope of coverage; compensation schedules; medical benefits; waiting time.

OCCUPATIONAL DISEASES: silicosis; hernia.

SECOND INJURY FUNDS

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MEDICAL TERMINOLOGY

EXPLANATORY OF TEXT: SELF-PRONOUNCING GLOSSARY: BIBLIOGRAPHY.

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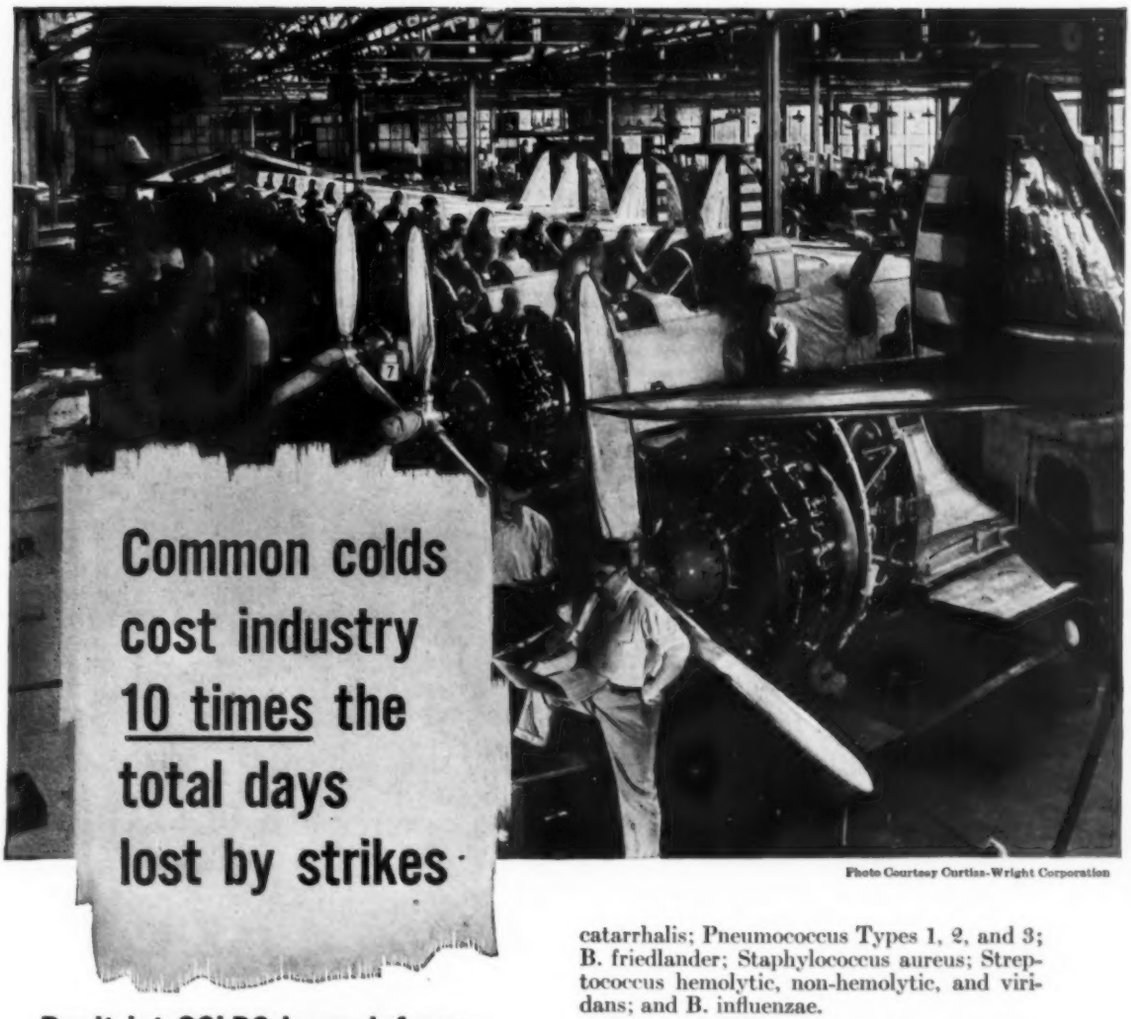

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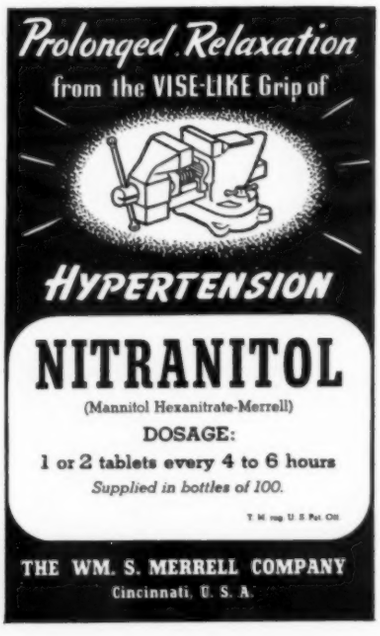
THIS MONTH

observations on the nutrition problem appear on page 476, has been identified with the study of this problem for many years. *Saturday Evening Post* for November 1, 1941, in an article about Dr. R. R. Williams and his development of thiamine, mentions Dr. Williams' use of PROFESSOR EDDY'S Laboratory at Columbia University in 1927 . . . . DR. BRITTON, so long identified with the field of industrial medicine, could not be permitted quietly to retire without at least a little recognition of his important career . . . THE world is vitamin conscious, in many ways, and with innumerable beneficial effects (page 481) . . . THE ideas of several years have finally crystallized into the "Industrial Nurse" supplement (page 501). Among the several features which make it interesting is the report "Industrial Hygiene and Nursing" (page 510) which abstracts the sessions given over to those subjects at the Thirtieth National Safety Congress in Chicago last month . . . . EARLIEST of imminent medical meetings is the Scientific Session of the CHICAGO SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY to be held at the Palmer House, Chicago, on Monday, November 10, at 8:30 P.M. Another is the Annual Midwinter Clinical Meeting of the CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY which is to be held on December 5, 1941—in the forenoon at Cook County Hospital, Chicago, and in the afternoon and evening at the Palmer House.



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DR. DONALD M. SHAFER, Associate Consultant for the Committee on Healthful Working Conditions of the National Association of Manufacturers, has gone to the Army.

DR. DONALD O. MCGOWAN, formerly General Motors' plant physician at Los Angeles, is a Captain in the Army.

DR. FREDERICK OETJEN, President-Elect of the FLORIDA ASSOCIATION OF INDUSTRIAL SURGEONS, is now MAJOR FREDERICK OETJEN, of Fort Benning, Georgia.

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DR. JOHN J. WITTMER, Consolidated Edison Company of New York, President-Elect of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS has been appointed to represent that association on the Industrial Advisory Committee of the National Society for the Prevention of Blindness, of which committee DR. LEONARD GREENBERG, Executive Director of the Division of Industrial Hygiene, New York State Department of Labor, is chairman.

Surgeon's Hobby

DR. WILLIAM F. LAUTEN, the subject of the following story which appeared in *Chicago Daily News*, October 17, 1941, will be re-

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membered as the author of the article on "Fingertip Reconstruction —a New Operation," page 99 of INDUSTRIAL MEDICINE for March, 1939. The newspaper item was in "Stories of the Day," entitled "Surgeon's Hobby — Cure Physical Handicaps Free," signed "J. C."

THERE is a little girl who was treated recently by a doctor. Her hands had been mangled in a wringer. He operated and after much pain and long confinement her hands began to respond. Yesterday there came a letter from her which said, 'Now I can help mommie with the dishes. I can even write this myself. My hands are as good as new.'

"That note, of course, made the physician who received it feel pretty good, almost as happy as his young patient. He is DR. WILLIAM F. LAUTEN, by vocation traumatic surgeon for the Chicago, Burlington & Quincy Railroad and a member of the faculty of Loyola University Medical School. By avocation, he is —well, he just takes a busman's holiday. He uses his surgical skill to brighten the lives of handicapped people and to make them useful members of the community again. That's his hobby and he told us he is having a fine time at it. Beats collecting stamps, he thinks; what sets it apart from his regular business is that he doesn't charge for this part of his activity. He practises his avocation at a clinic at the Grant Hospital. The institution itself imposes a very small fee and that's the end of it.

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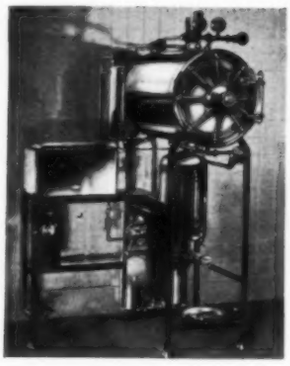

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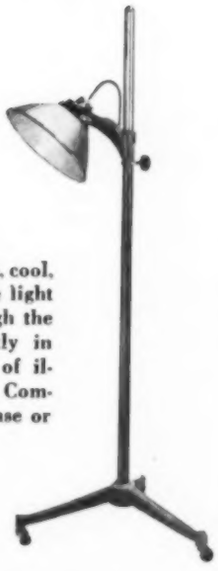

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deformity or other handicap that prevents him from going about his usual business you've helped him and got some satisfaction for yourself, too. Plastic surgery is involved in what we do here but we haven't any time for people who just want to be made pretty. Women can get their faces lifted or their eyes slanted somewhere else. But if a girl—a receptionist, say—found she couldn't get work because a scar had disfigured her face we'd take it off for her. In fact, we've had a patient like that.'

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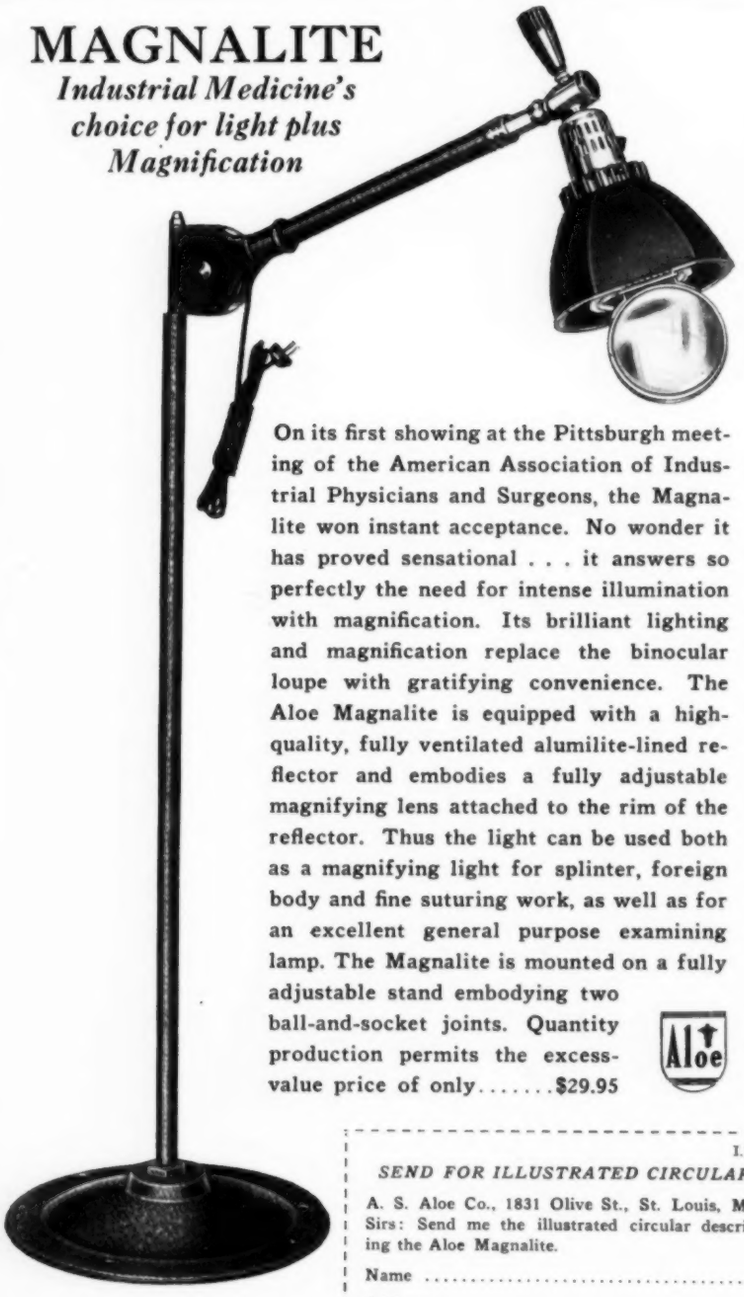

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gets out of his hobby is an inner satisfaction, such as comes over him when he hears that a little girl can help her mother with the dishes."

Medical Opportunity

INDUSTRIAL HYGIENE FOUNDATION'S monthly digest of articles on industrial medicine, hygiene, and related subjects, abstracts an article entitled "Industrial Health—A Medical Opportunity," by CARL M. PETERSON, Secretary of the A.M.A. Council on Industrial Health, in *Virginia Med. Monthly*, as follows: "Industrial medicine should occupy a greater part of medical education. Physicians should take a greater interest in workers' health—it would be of advantage to them, to the worker and to the community. The widespread adoption of workmen's compensation legislation makes it imperative for physicians to recognize and report industrial diseases. Medical societies, both state and local, are organizing committees for the improvement and dissemination of such work in their communities. To achieve the best results, all groups public and private, should collaborate."

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THE industrial surgeon has a harder task than the physician in any other branch of medicine. He is the go-between for the patient, labor union, industry and the insurer. His whole aim is to get the patient back to work with the least amount of time lost and with the least amount of disability, both temporary and permanent, and to insure the greatest amount of comfort to the patient during convalescence.—LELAND F. CARLTON, M.D., Tampa, Florida, in *J. Florida M.A.*, October, 1941.

Definition

IN 1940 the Minnesota Department of Health organized an Industrial Hygiene Unit, to provide industry with a technical medical and engineering service for the control of occupational diseases, and to promote more adequate medical services within industrial plants. As a preliminary, the unit conducted a statewide survey of plant medical services and plant conditions and processes. In July, 1941, the State Board of Health changed the status of the Industrial Hygiene Unit to that of a Division of Industrial Health. Effort is being made now to stimulate the reporting of occupational diseases.

For the purpose of this report, an occupational disease may be defined as an illness of the body which has the following characteristics:

1. It rises out of and in the course of the patient's occupation.
2. It is caused by a frequently repeated or a continuous exposure to a substance or to a specific industrial practice which is hazardous and which has continued over an extended period of time.
3. It presents symptoms characteristic of an occupational disease which is known to have resulted in other cases from the same type of specific exposure.
4. It is not the result of ordinary wear and tear of industrial occupation or the general effect of employment or the kind of illness that results from contacts or activities in life outside of the patient's occupational pursuits.—*Minnesota Medicine*, October, 1941.

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Toxic Signs

BASED on their contention that the first signs of exposure to toxic or poisonous chemicals are definite changes in pulse rate and in blood pressure, John H. Foulger, M.D., and Allan J. Fleming, M.D., Wilmington, Delaware, report a new method for medical control of industrial health whereby the earliest signs of exposure to various chemical compounds are detected by means of blood pressure measurements recorded regularly on special charts designed by them. — See J.A.M.A., September 6, 1941.

New Chemical

A CHEMICAL from the earth itself, the most powerful germ killer yet discovered, better even than the sulfa drugs, has cured in a remarkably short time an array of difficult and dangerous human ills, according to reports from the Mayo Clinic and the Massachusetts Memorial Hospitals to the American Society for Clinical Investigation meeting in Atlantic City, N. J. The new chemical is gramicidin. It is produced by bacteria that live in the soil. Its discovery was announced in 1939 by Dr. René J. Dubos, of the Rockefeller Institute for Medical Research, but the reports at the meeting are the first on its use in human patients. Empyema from pneumonia, sinusitis, bladder infections and dangerous and hard-to-cure staphylococcus infections in wounds are the conditions this new chemical cured in remarkably short time. That infected wounds were freed of all bacteria within 24 hours after gramicin treatment, following which the wounds rapidly healed, was reported by Dr. Charles H. Rammelkamp and Chester S. Keefer of Boston. The

—*Continued on page 499*

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The Journal of Occupational Diseases and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 10 NOVEMBER, 1941 Number 11

Arteriosclerotic Vascular Disease

—An Introduction—

CARL A. JOHNSON, M.D.,
Associate in Medicine, Northwestern University Medical School, Chicago

THE subject of arteriosclerotic vascular disease being large, only a brief presentation is possible in my allotted time. It being necessary to limit the subject, I shall present only a clinical pathological discussion showing some symptoms and complications leading to death.

Arteriosclerosis does not lend itself well to an adequate definition. Ludwig Aschoff[1] states:

"To sum up, we understand by arteriosclerosis a chronic disturbance of the vessel which manifests itself by deposits of the most varied kinds in the vascular walls and which becomes irreversible on reaching its climax in vessels impaired by changes attending the process of aging with resulting deformation of the lumen and brittleness of the vascular walls." This indicates arteriosclerosis is a change in the vessels as part of the aging process; but, as Aschoff states, opinion differs as to whether it exists as a disease separate from the aging process. He states[2] that if it is only a part of the aging process, "neither remedies nor prophylactics would be of avail, for no one can escape age or death." He further states that if "we ever were to suppose that arteriosclerosis is a special pathological process superadded to the process of aging, things would present themselves in a different light, however intimately the two processes might be connected." From this it would be rational to consider arteriosclerosis as part of the aging process but hastened by conditions such as heredity and arteriosclerotic disposition; metabolic diseases such as diabetes and cholelithiasis; endocrine disturbances such as hyperfunction of the parathyroid glands; infectious diseases, particularly with staphylococcus; and certain renal diseases.

The importance of arteriosclerosis in clinical medicine and the important place it occupies in industry by producing long disabling illnesses or sudden death, cannot be overemphasized. It is stated aptly by Aschoff[3] that "No disease other than arteriosclerosis, to which man is heir, is apt to lead so frequently to dangerous conditions, or to cut the thread of life without warning." The degree and distribution of arteriosclerosis vary so greatly in different individuals that, obviously, the symptoms must be divergent. With this in mind, several illustrative case reports have been chosen which include correlated studies of clinical symptoms and pathological findings showing that in each case, though the symptoms be different, the complications of arteriosclerosis are involved.

Case Reports

THE first group of case reports illustrates the changes observed in patients with marked atherosclerosis and occlusions of vessels which ultimately led to death.

CASE 1: M. S., a Negress, aged 71 years, was admitted to St. Luke's Hospital March 4, 1940, and died March 23, 1940. Her complaints were of symptoms of indigestions of belching, vomiting, gas, and abdominal distress, particularly after meals, of many years' duration, and of precordial pain which radiated to the jaw and down the left arm and lasted as long as three hours. She entered the hospital for a gall-bladder study, which, in view of the history and cardiac findings, was not made. She had been receiving treatment for gall-bladder disease for many years. Upon examination, the heart was enlarged and boot shaped. The rate was 90. A gallop rhythm was present. A loud, rough systolic murmur was heard best over the aortic area. The blood pressure on first examination was 200/100, but later dropped to 130/90. The blood Wassermann reaction was negative; the sedimentation rate was 28 mm. in one

From the Department of Clinical Research St. Luke's Hospital, and the Department of Medicine Northwestern University. Presented at the Fifty-Second Annual Meeting of the AMERICAN ASSOCIATION OF RAILWAY SURGEONS, Chicago, September 9, 1941.

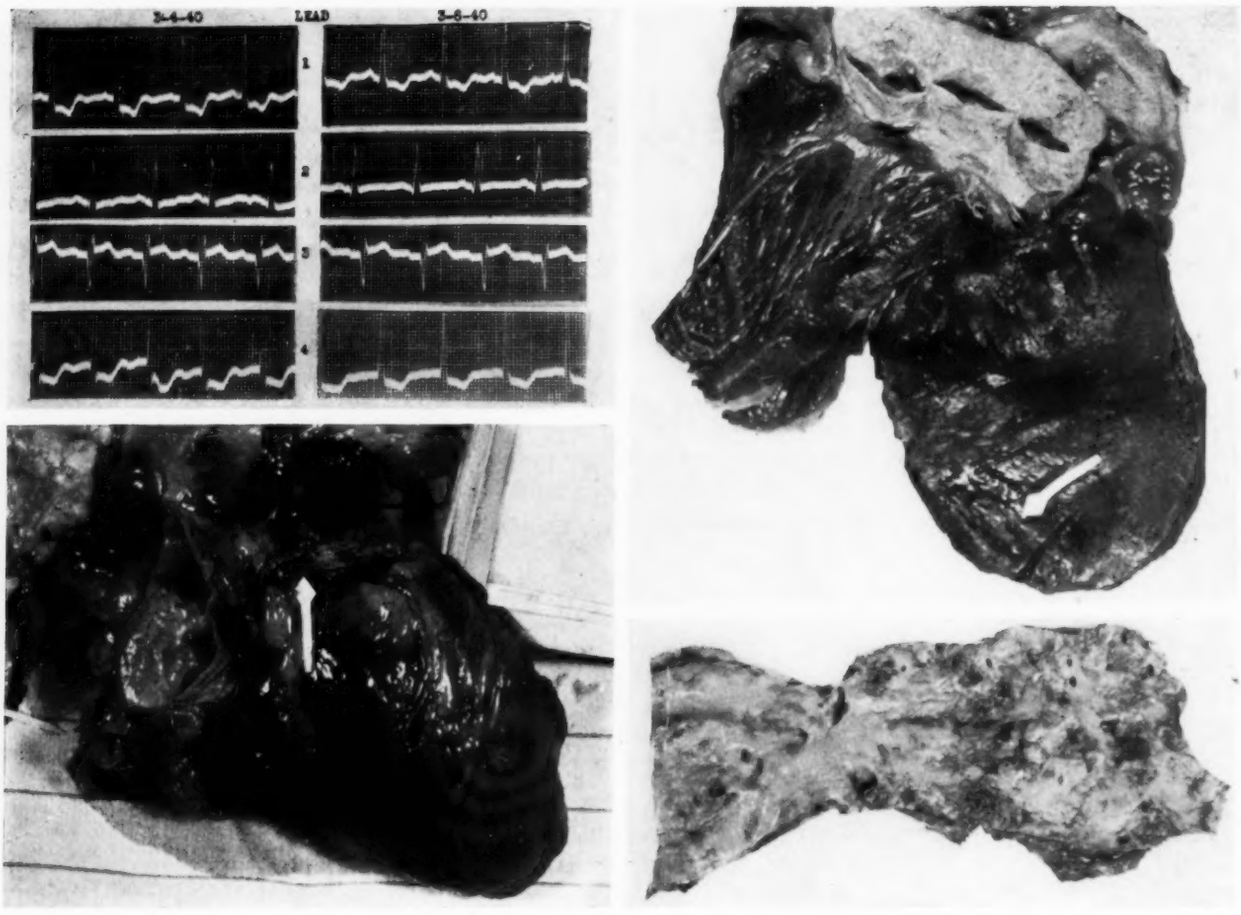


Fig. 1.

Upper Left: The electrocardiograms taken on Case M.S. Note the depressions of the ST segment in leads I and IV, inversion of QRS 3, and inversion of T 1 and 4. These changes are consistent with acute coronary occlusion.

Lower Left: A large arteriosclerotic ulcer in the circumflex branch of the left coronary artery.

Upper Right: The left ventricle with a large area of infarction.

Lower Right: A portion of the abdominal aorta showing the marked artherosclerotic changes.

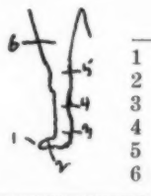
hour, and the electrocardiogram showed progressive myocardial changes. The patient's symptoms increased in severity and, following a convulsive seizure, she died without regaining consciousness.

A postmortem examination by Dr. E. F. Hirsch revealed the following anatomic diagnosis: Organizing infarct of the myocardium of the left ventricle and of the septum of the heart; ulcerated atheroma of the ramus circumflex of the left coronary artery; marked calcified atherosclerosis with constriction of the channel of the anterior descending branch of the left coronary artery; fibrous changes of the anterior mitral leaflet; calcified mitral ring; calcification of the attachments of the aortic leaflets; marked calcified atheromatous and senile sclerosis of the aorta; and biliary concretions of the gall-bladder.

The electrocardiograms with photographs of the heart and aorta, illustrated in Fig. 1, show a left axis deviation, depressions of the ST segment in leads I and IV, and an elevation in lead III, indicating a posterior infarct. The specimen of the heart shows an atherosclerotic ulcer of the circumflex branch of the left coronary artery from which occlusion of the vessel occurred. The specimen of the aorta illustrates marked atherosclerotic changes and ulcers, particularly in the abdominal portion.

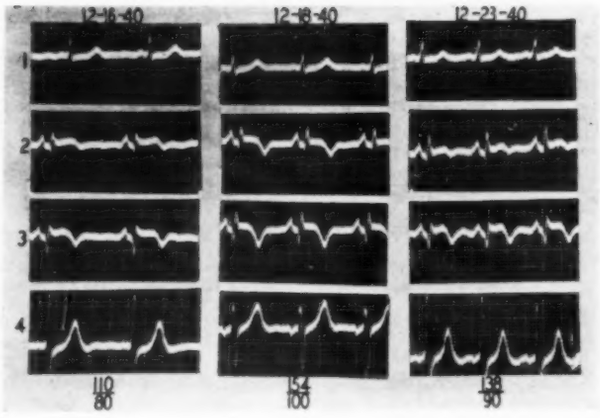
This case report illustrates the findings in a patient with marked atherosclerosis resulting in coronary occlusion and death as a complication of arteriosclerosis.

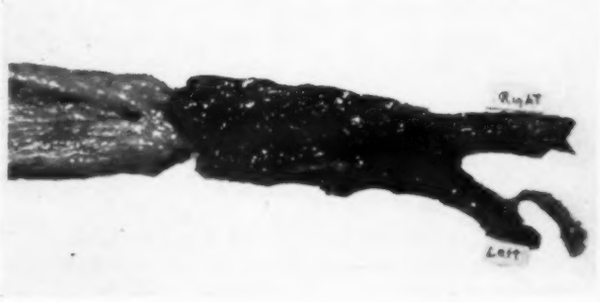
CASE 2: L. M., a white male, aged 58 years, was admitted to St. Luke's Hospital December 15, 1940 and died December 28, 1940. He complained of weakness, shortness of breath, and burning in the chest. Having collapsed at work, he immediately was brought to St. Luke's. He had an ashen gray appearance; his lips, nail beds, and lobules of the ears were cyanotic. He appeared very distressed. The heart tones were distant, a regular rhythm was present, and no murmurs were heard. The blood pressure on admittance was 130/90. It later decreased to 106/80 and subsequently rose to as high as 170/110. The patient developed a temperature of 101° F. and a leucocytosis to 15,000, but was free of symptoms for five days when, suddenly, he developed symptoms of an occlusion of the abdominal aorta. They were fairly typical and consisted of sudden severe pain in the legs, pallor, numbness, loss of sensation, loss of reflexes, absent pulsations in the femoral, popliteal, and pedal arteries, and almost invariably a fatal termination within a short time—eight days, in this case. The extremities did not become abnormally cold in this patient nor in three others with similar pathology. The skin temperatures as recorded from the legs on this patient were as follows:



Room Temperature: 82.5°

	Right	Left
1	83	83
2	85.5	86
3	87.2	88.5
4	90	92
5	92.2	92.2
6	92.2	92.2





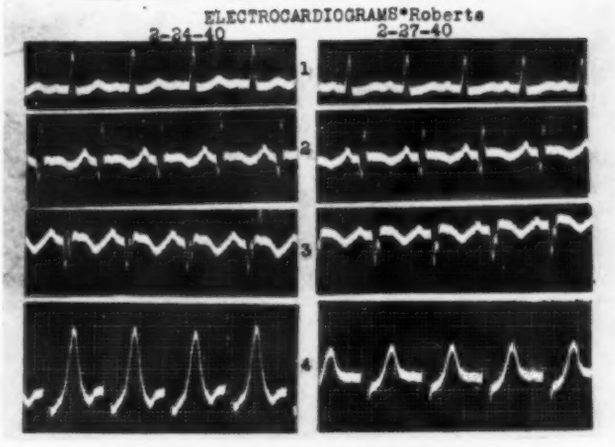


Fig. 3.

Upper: The electrocardiograms on Case 3. Note the "W" shaped QRS 3 and the inversion of T 2 and 3.

Lower: The site of the rupture in the left ventricle.

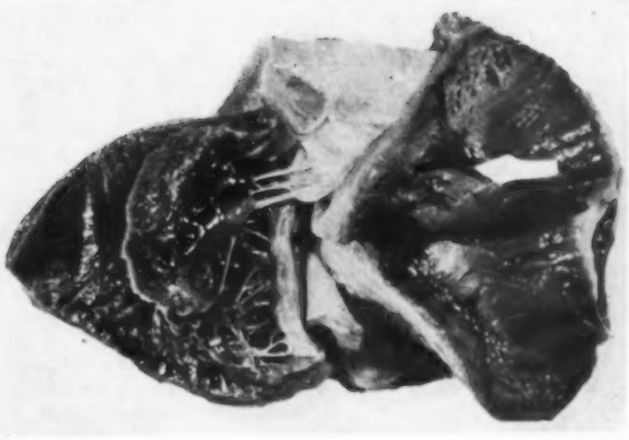


Fig. 2.

Upper Left: Serial electrocardiograms on Case L.M., showing the progressive changes.

Lower Left: A photograph of the abdominal aorta, showing the occlusion from the level of the inferior mesenteric artery down into the common iliac arteries.

Upper Right: A photograph of the heart, showing the large area of infarction and softening of the left ventricle.

Lower Right: Another view of the heart, showing the infarct in the septum of the heart.

The patient's condition remained about the same until December 26, 11 days after the coronary occlusion and six days after the occlusion of the abdominal aorta. He then suddenly developed paroxysmal, excruciating burning pains in the abdomen with distention and gas. These pains were not completely relieved with 0.5 grain of morphine. His condition became rapidly worse, the symptoms increased, and the genitalia became discolored and later showed signs of early gangrene. The patient expired on December 28, 13 days after the coronary occlusion, eight days after the occlusion of the abdominal aorta, and three days after the onset of the abdominal symptoms.

An autopsy by Dr. E. F. Hirsch revealed the following anatomical diagnosis: Recent organizing thrombus of the left coronary artery of the heart; recent extensive hemorrhagic posterior infarction of the myocardium of the heart; hemorrhagic necrosis and softening of the myocardium of the left ventricle and septum of the heart; extensive senile atherosclerosis of the aorta, its main branches, and of the coronary arteries of the heart; extensive obturating thrombosis of the abdominal aorta, common iliac, external and internal iliac, femoral arteries, and inferior mesenteric artery; focal hemorrhagic necrosis (gangrene) of the sigmoid colon, lower abdominal wall tissues, and abdominal wall tissues; progressive dry gangrene of the toes, penis, scrotum, etc.

The electrocardiograms (Fig. 3) show inversion of QRS 3, elevation of the ST segment, and inversion of the T wave in leads II and III.

The photographs of the heart reveal the large areas of infarction and softening in the wall of the left ventricle and septum of the heart. The photographs of the aorta show the complete occlusion of the abdominal aorta up to the inferior mesenteric artery and on down into the common iliac arteries.

CASE 3: H. R., a white male, aged 53 years, was admitted to St. Luke's Hospital February 23, 1940. His complaints were of a carbuncle on the right side of his neck for five days; severe pain in the substernal region for two or three weeks; and weakness, fatigue, and shortness of breath. The previous two or three weeks he had had substernal pain which radiated down both arms and was very severe. He also perspired freely, was very short of breath, and very apprehensive. Soda gave him some relief from the attacks. Upon examination, the patient had the appearance of being in distress. He had an ashen color, was nervous, and perspired freely. There was a carbuncle on the side of his neck. The heart was enlarged, with a rate of 116, regular rhythm, and no murmurs. The blood pressure was 185/125. Laboratory examinations revealed a 3,030,000 red blood count, a 12,100 white blood count, and a 6.1 gm. per 100 cc. blood hemoglobin, with 30 mgm. of albumin per 100 cc. in the urine. Cultures made from the carbuncle showed a staphylococcus aureus infection. The electrocardiograms revealed progressive myocardial damage. The patient died suddenly on February 28, 1940.

An autopsy by Dr. E. F. Hirsch revealed the following anatomical diagnosis: Recent thrombosis of the left coronary artery at its bifurcation into the left anterior branch and the circumflex branch; recent infarct of the myocardium of the left ventricle and septum of the heart; myomalacia and recent spontaneous rupture of the myocardium of the left ventricle of the heart; hemopericardium; acute fibrinous pericarditis; recent mural thrombus of the endocardium of the left ventricle of the heart; senile sclerosis and fatty changes of the aorta, its main branches, and of the coronary arteries.

The electrocardiograms (Fig. 3) with photographs of the heart show inversion and a "W" shaped QRS 3 and inversion of T 2 and 3. The photograph of the heart shows the site of rupture of the heart.

This report illustrates a further complication of arteriosclerotic vascular changes: First, the arteriosclerosis with vascular narrowing and roughening of the lining followed by thrombosis; second, ischemic necrosis and softening of the involved myocardium; and third, rupture of the myocardium, and death. Associated with these changes, a fibrinous pericarditis and formation of an intramural thrombus had occurred. The intramural thrombus had not broken loose, with the complications of emboli, as in the preceding case report.

In 1940, Gross and Phillips[4] reviewed the literature and reported seven patients with complete occlusion of the abdominal aorta. They indicated that the condition may occur by several means: (1) In an embolic form, as in a thrombus higher in the aorta, as in aortic aneurysm or thrombosed arteriosclerotic plaque; or (2) on the left side of the heart, as in mural thrombi secondary to myocardial infarct; or valvular vegetations, that is, subacute or acute bacterial endocarditis; (3) pulmonary veins, as in thrombus; (4) right side of the heart, by way of the foramen ovale (paradoxical embolism). It may occur also by thrombosis in situ associated with ulcerated atherosclerotic plaque; dissecting aneurysm of the aorta; arteritis of the abdominal aorta; and congenital narrowing of the aorta; or by infection, by way of the umbilical vessels, in infants, associated with infectious diseases, as diphtheria and influenza.

These authors presented the generally accepted clinical picture of occlusion at the bifurcation of the aorta as of a sudden onset with severe acute symptoms and violent pain. Sensory loss and areflexia, numbness, coldness, pallor, cyanosis, and loss of pulsations in the lower extremities develop. Paraplegia and shock follow with ascending gangrene, eventuating rapidly in death.

The collateral circulation following such an occlusion is listed as follows:[4] ". . . the internal mammary artery above with the deep epigastric below; the inferior mesenteric above with the internal pudic below; branches of the lumbar arteries above with internal iliac branches below."

Fig. 4.

Upper Left: The electrocardiogram in case F.D. Note the depression of the ST segment in lead I and elevation in leads II and III, and inversion of the T wave in leads II and III. These changes suggested a posterior infarct.

Lower Left: Photographs of the thoracic and abdominal aortas, showing the extensive atherosclerotic and ulcerative changes.

Right: A photograph of the heart, showing the extensive areas of infarction in the left ventricle and septum of the heart.

This case illustrates further the complications which may occur from atherosclerosis: Atherosclerosis of the coronary vessels followed by thrombosis; myocardial infarction with softening of the myocardium and the formation of mural thrombi; and the so-called "straddle" embolus from the heart, lodging at the bifurcation of the aorta into the common iliac arteries with complete occlusion; extension of this occlusion up the abdominal aorta, occluding the inferior mesenteric artery; and gangrene of toes, large bowel, scrotum, penis, and part of the lower abdominal wall.

CASE 4: F. D., a white male, aged 59 years, entered St. Luke's Hospital December 28, 1938 and died January 8, 1939. He complained of dyspnea, orthopnea, swelling of the abdomen and ankles, and pain over the precordium which radiated down the left arm. He had had vascular disturbances since 1927, at which time he had intermittent claudication. In 1932, his physician, after a thorough examination, made a diagnosis of Buerger's disease. That year he gave up his work because of the severity of the symptoms. In 1934 another physician confirmed the diagnosis of Buerger's disease. A perivertebral nerve block remained uncompleted, for the patient had a coronary thrombosis during the procedure and fainted. In 1935 he had a mild stroke, from which he had a good recovery. In the past few years he had several heart attacks which were believed to be small coronary occlusions. On examination, the heart was enlarged, mainly to the left, and occupied 55% of the chest. The heart tones were faint and a gallop rhythm was present. The heart rate was 100. The blood pressure before the last illness was 164/100 on the right and 108/80 on the left. The radial pulse on the left could not be palpated; roentgenograms revealed no cervical rib. The legs were edematous and for a number of years the pedal vessels could not be palpated. The leg vessels could not be visualized for soft tissues by x-ray. The patient failed rapidly and died on January 3, 1939.

The autopsy findings by Dr. Hirsch revealed the following anatomical diagnosis: Huge recent hemorrhagic and necrotic infarct of the myocardium of the left ventricle of the heart; acute fibrinous pericarditis of the right auricular appendage of the heart; marked dilatation of the left ventricle; obliterating atheromatous senile sclerosis and fatty changes of the first part of the left subclavian artery; obliterating atheromatous senile sclerosis and fatty changes of the coronary arteries of the heart; and marked calcified and atheromatous senile sclerosis of the aorta, right and left femoral, right subclavian artery and of their branches.

The electrocardiograms and photographs of the heart and aorta are illustrated in Fig. 4. The electrocardiogram reveals a slurring of QRS 2-3-4, inversion of QRS 4, a depression of ST 1, elevation of ST 3, and inversion of T 2-3, indicating a posterior infarct. The photograph of the heart shows the extensive scarring of the left ventricle; that of the aorta shows marked arteriosclerotic changes.

In contrast to the previous three cases, this patient had occlusions of the peripheral arteries due to arteriosclerosis leading to incapacitating symptoms in his extremities as well as a cerebral vascular accident. As a result of the symptoms in his extremities from arteriosclerosis, a common error in diagnosis of Buerger's disease was made. This disease is rare and a diagnosis of it should not be made until arteriosclerosis as a cause for the symptoms has been ruled out.

This report illustrates a patient with extensive arteriosclerosis leading to multiple occlusion of the peripheral vessels followed by a coronary thrombosis as a terminal event.

Summary

THE clinical and pathological findings of four patients with arteriosclerosis are presented. In all four, the arteriosclerosis led to thrombus formations and death after variable periods of incapacitation. The importance of this condition cannot be overemphasized when it is recognized as the basic cause of virtually all cases of coronary thrombosis and most cases with peripheral vascular occlusion.

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Esophageal Hiatus Hernia

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ESOPHAGEAL hiatus hernia is not at all an uncommon occurrence, and while it is now being diagnosed with increasing frequency and accuracy, it is still very much under-diagnosed. A great many cases are still diagnosed and treated as some upper abdominal disease, usually duodenal ulcer, or cholelithiasis or cholecystitis, or as some form of cardiac disease. Harrington[1] in a series of 198 cases, found that an average of three erroneous diagnoses were made upon each patient. Twenty-three of this series had been previously operated upon for some upper abdominal disorder.

As a cause of industrial disability, hiatus hernia has received little or no attention. And yet it is unquestionably an occasional cause of disability, either because of upper abdominal symptoms, or because of cardiac symptoms such as dyspnea, or palpitation, or paroxysmal auricular fibrillation, or anginal pain, occurring because of the hiatus hernia, and usually remediable. A careful history will enable a probable diagnosis to be made, later confirmed by roentgen examination. The possibility of the presence of a hiatus hernia should always be kept in mind in all cases in which upper abdominal symptoms occur, or in the presence of cardiac symptoms. This is applicable, even if some organic pathology is demonstrated, as hiatus hernia not infrequently accompanies duodenal ulcer or gall-bladder disease.

Diaphragmatic hernia of traumatic origin, or that due to congenital defect of the diaphragm, is not within the scope of this discussion. We are interested here only in the hiatus hernia, in which a portion of the cardiac end of the stomach presents above the diaphragm, through the esophageal hiatus.

Such hiatus hernias constituted 75% of Harrington's series. But this series was drawn from patients seeking surgical relief. It is to be expected, that with increased watchfulness, a very much larger proportion of hiatus hernia would be found in general practice, where the milder cases would predominate.

Akerlund[2] has recognized three types of esophageal hiatus hernia:

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1. Those with a congenitally short esophagus, with a partial or complete thoracic stomach. This type is usually not a true hernia. Occasionally included in this group, however, are probably some borderline cases in which a fairly large portion of the stomach is above the diaphragm, but in which the apparently short esophagus was not congenital.

2. Normal length esophagus, with the lower end attached to the hiatal ring, but in which a portion of the stomach has pushed up through the hiatal opening, and lies by the side of the lower end of the esophagus above the diaphragm, forming a so-called para-esophageal hernia.

3. A short esophagus, or an apparently short esophagus, forming part of the hernia contents. Most of the cases seen clinically belong in this group.

The second and third types are usually reducible, and tend to reduce spontaneously in the erect position, or under suitable conditions. In a very few cases, adhesions have formed, making the hernia not reducible.

It is possible that in group 3, there are some cases with a congenitally short esophagus. It is probable, however, that in most of them the esophagus is not anatomically shorter than normal. The hernia usually reduces spontaneously, or may be absent for hours or days or weeks. This would not occur if there were actually a very much shortened esophagus.

It is notable that hiatus hernias are rare in the earlier decades of life, which would not be the fact if a congenitally short esophagus was the determining factor in the occurrences. Root and Pritchett[3] had only two cases in the fourth decade, and the average age was 59. Our youngest case was 40, and the average age again was 59. The data from which our own figures are taken were from an experience with an older age group. The younger age groups should be systematically explored. From the evidence at hand, hiatus hernia is very unusual in the first four decades.

It is probable that in the later decades, there is some relaxation of the ring, and of the diaphragmatic-esophageal ligament. As Hurst[4] observes, the loose attachment of the esophagus to the diaphragm would permit a slight increase in intra-abdominal pressure to push a small segment of the cardiac end of the stomach through the hiatal opening, especially if there were senile changes tending to relax the tissues. Hiatus hernia is more frequent in those of sthenic habitus than in those of asthenic. A frequent cause of increased intra-abdominal pressure is obesity, especially if the abdominal walls have remained muscular and unrelaxed. Flatulence sometimes produces enough intra-abdominal pressure to produce a hiatal hernia, and the hernia may reduce after the expulsion of flatus. Ascites may be a cause, or a large ovarian cyst, as in the case reported by McArdle.[5] Bending over, as to tie a shoe, or bending over a desk, may produce the increased intra-abdominal pressure necessary to cause the herniation, as may emesis, or coughing.

Von Bergman,[6] quoted also by Hurst,[4] has advanced the theory that many cases of hiatus hernia are due not to pulsion from below because of increased intra-abdominal pressure, but to a traction from above exerted by a shortening of the longitudinal fibres of the esophagus. This shortening of the longitudinal fibres of the esophagus he considers to be due to viscero-visceral reflexes resulting from stimuli arising from various subdiaphragmatic sources. Such a mechanism would account for the period of remission observed in hiatus hernia and for the relation of the recurrences to over-work and nervous and emotional strain.

The symptoms of hiatus hernia may resemble those of many other abdominal disorders, but especially gall-bladder disease and duodenal ulcer. There is no need to review the symptomatology in detail. It has been thoroughly covered by Harrington,[1] Hedblom,[8] Hurst,[4] Guthrie,[9] Root and Pritchett,[3] and many others. In spite of this similar symptomatology, there are several points in the history which help in differentiation and make a diagnosis of hiatal hernia probable. The pain, or discomfort, or symptoms of gastric distress may only appear on lying down, especially after meals, and may be relieved by assuming an erect position, or sitting up. In some, the symptoms appear on going to bed at night, and may awaken the patient during the night and be relieved by standing up, or the patient may have to sleep partially propped up on pillows. Stooping over, or bending, may bring on the symptoms. The symptoms are usually not relieved by food, but may be relieved by carbonated waters, or sodium bicarbonate, which distend the stomach and cause the herniated portion to slip out from its niche. In some, the distress is relieved by belching, or by passing flatus. Small meals are better tolerated than large meals. Indigestible meals are ill tolerated, just as in duodenal ulcer, or gall-bladder disease. There is not the specific response to a fatty meal that usually accompanies gall-bladder disease, but a fatty meal may initiate symptoms of hiatus hernia by bringing on a gall-bladder attack. Von Bergman considers that the pain under the lower third of the sternum experienced in gall-bladder disease is due to a hiatus hernia reflexly induced by the vagal stimulation of the gall-bladder attack.

Ingestion of roughage may, in like manner, induce an attack by over-stimulation of the large bowel. This is also true of strong cathartics. Foods which produce an allergic response may produce symptoms, probably by vagal stimulation and traction through the shortened longitudinal fibres. Cough is a frequent symptom, as pointed out by Hedblom.[8] This is a short, irritating, dry cough, and may be associated with nausea or emesis or salivation, and is usually relieved by assuming the erect posture.

There is nothing absolutely characteristic or distinctive in the pain itself which would differentiate it from gall-bladder disease or duodenal ulcer or other abdominal diseases. Differentiation must depend upon the history. There is not the tenderness or muscular defense which usually accompanies gall-bladder or ulcer pain.

A secondary anemia may be present, due to ulceration within the herniated portion, especially in cases where this is fixed by inflammatory adhesions. There may be no upper abdominal symptoms, but only symptoms suggestive of some cardiac or respiratory disorder. More frequently, both groups of symptoms are present. The cardiac or respiratory symptoms may be due to mechanical displacement of thoracic viscera, or may be due to reflex effects. Except in the case of a short esophagus with thoracic stomach, or partial thoracic stomach, the hernia is rarely of sufficient size to embarrass respiration. In a few cases of reducible hernia, the dyspnea or the palpitation may be due to mechanical displacement. It is possible that in some cases the paroxysmal attacks of auricular fibrillation may be due to mechanical displacement, causing increased irritability. Usually, it is more probably reflex in origin, as are the attacks of palpitation.

The anginal pain is not "angina-like," as is so frequently stated. It is characteristic anginal pain, and is a true angina pectoris, due to an actual reflex vaso-constriction of the coronary arteries, mediated through the vagus and relieved by atropine. That such a reflex coronary vaso-constriction occurs with gastric distention was shown by Dietrich and Schweigh, working with von Bergman in 1932, and repeated by Gilbert, Fenn and LeRoy in 1940. The reflex vaso-constriction of the coronary arteries is more marked if the pressure occurs at the cardiac end of the stomach. It also occurs upon distention of the free abdominal cavity. This reflex vaso-constriction is abolished by atropine, and in the experimental animal, by atropine or vagal section.

Any case in which there are upper abdominal symptoms should be examined roentgenologically for hiatus hernia. This is true also, even if there should be undoubted evidence of gall-bladder or duodenal ulcer, for such disorders are frequently associated with hiatus hernia. The presence of hiatus hernia should always be suspected in cardiac cases with dyspnea, unless of definitely known cause. In cases of paroxysmal fibrillation, or of angina pectoris, it should always be suspected. The following cases are illustrative:

CASE 1: R.H.P., age 52, is a telegraph operator and station agent. Before entering St. Luke's Hospital, he had been off work for three years, following what was diagnosed as a cardiac condition. There was a long train of nervous symptoms, much of which was referable to the diagnosis. There was some shortness of breath on exertion, as when loading or unloading baggage. The heart was normal in every way, as were all of the routine examinations. Upon roentgen examination, a large hiatus hernia was found, with an apparently shortened esophagus. About two-thirds of the stomach was above the diaphragm, lying flat upon the dome of the diaphragm. There had been no symptoms prior to an attack of influenza just preceding the onset of the present symptoms. It can not be definitely determined whether we are dealing here with a short esophagus and a partial thoracic stomach, or whether it is not a pulsion hiatus hernia, induced by long continued coughing, with a normal esophagus. The fact that this man could work with comfort previous to the pneumonia, suggests that it was acquired at that time.

CASE 2: C.M., age 52, is a railroad switchman. There had been no previous illness or accidents. In October, 1940, while walking down the yard, he stooped over to turn on a switch which was weighted with a heavy ball. He became very dizzy and faint and had to support himself by placing his hand against some freight cars, as he walked to the tower. At the tower, he was considered to have had a heart attack and was sent home. The local physician found the heart to be fibrillating and the patient was recommended for a pension. Upon entrance to the hospital, the heart was found to be within normal limits, but he was found to be suffering from paroxysmal attacks of auricular fibrillation, occurring after meals. Roentgen examination showed a hiatus hernia, about the size of a small orange, which was reducible. The patient had a very obese abdomen, with firm, muscular walls, sufficient to account for enough increased intra-abdominal pressure to cause a pulsion hernia. He was placed upon a moderate reducing diet with a loss of 42 pounds. He has been entirely free from symptoms and is back at work.

CASE 3: R.A.S., age 57, is a switchman. He entered St. Luke's Hospital with a history of anginal pain, occurring after meals, worse if he assumed a recumbent position, and relieved by assuming an erect position. Examination showed a heart normal in size and contour, with normal electrocardiogram. At the time of the roentgen examination, no evidence of a hiatal hernia was found. We still consider that herniation is present at times. At the time of the examination, he had had several days of sitting quietly in the hospital, and had become well-rested, under which conditions the hernia would be less likely to show.

CASE 4: F.C., age 47, is a musician. For several years he has been diagnosed as having duodenal ulcer, cholelithiasis, angina pectoris, and, on two occasions, spent several weeks in bed because of a supposed coronary thrombosis. The heart is normal in every way. The gastric discomfort is worse if he lies down, and is relieved by standing up. If he lies down immediately after a meal, he feels as though "gas were crowding his heart" and must get up immediately. There has been typical anginal pain at times. The attacks come on with overwork, fatigue, and especially worry or apprehension or emotional excitement. Roentgen examination reveals a hiatus hernia, readily reducible, and only apparent on one film and under the fluoroscope. This we definitely believe to be due to traction caused by shortened longitudinal fibres. With care and rest, this patient remains well.

CASE 5: A.L.A., age 84, had been diagnosed as having cholelithiasis by several doctors, and as having angina pectoris. She entered St. Luke's Hospital in order to determine the cause of a severe secondary anemia. Roentgen examination revealed a large hiatus hernia, irreducible, and with extreme ulceration. She has been well now for two years upon medical treatment.

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Cooling Workers in Hot Industry

F. C. HOUGHTEN, D.Sc., M. B. FERDERBER, M.D., *and* CARL GUTBERLET

THE effect of heat on workers in hot industries is receiving increasing recognition as an important factor in industrial hygiene. This is due not only to a better understanding of the thermal relations between man and his atmospheric environment, but also to a greater extent to the extension of hot processes in modern industry.

The study of the relations of man to his atmospheric environment, particularly those dealing with production and dissipation of heat, has received extensive investigation over the past 20 years. Our knowledge of this subject has been greatly extended by the work of Leonard Hill, Vernon, Bedford, and others in England, the investigations of Philip Drinker and his associates of the Harvard School of Public Health, and the studies of the Research Laboratory of the American Society of Heating and Ventilating Engineers in cooperation with the U. S. Bureau of Mines and the U. S. Public Health Service.

More recently, the Research Laboratory of the American Society of Heating and Ventilating Engineers has investigated the effect of hot industrial atmospheres on men, and has reported[1, 2, 3] the physiological response of men employed at light work while standing in various hot atmospheres. Fig. 1, taken from this study,[3] shows the relation between the body temperature rise in these workers and the effective temperature of the environment. It will be seen from these curves that a rise in body temperature occurs in atmospheres hotter than 80° ET. For atmospheres of 85° ET and higher, the rise in body temperature is quite significant.

While the question of the allowable rise in body temperature without violent or permanent harm to the individual must be determined by the medical profession, it has been suggested without much criticism that an average rise of ½° for all workers or a 1½° rise for any worker during a shift might be the maximum. The data shows that this rise may be expected in three hours in an atmosphere of approximately 86° ET. This effective temperature may be obtained with 90° dry-bulb and 80% relative humidity, 97° dry-bulb and 50% relative humidity, or 107° dry-bulb and 20% relative humidity. Since there are many industrial processes and practices resulting in considerably hotter conditions it is evident that either the work period must be shortened, the temperature rise of the atmosphere limited by comfort cooling, or the individual himself cooled without regard to the surrounding atmosphere.

Where a large number of workers are engaged in a given enclosure, the indicated solution is obviously comfort cooling of the entire enclosure. This

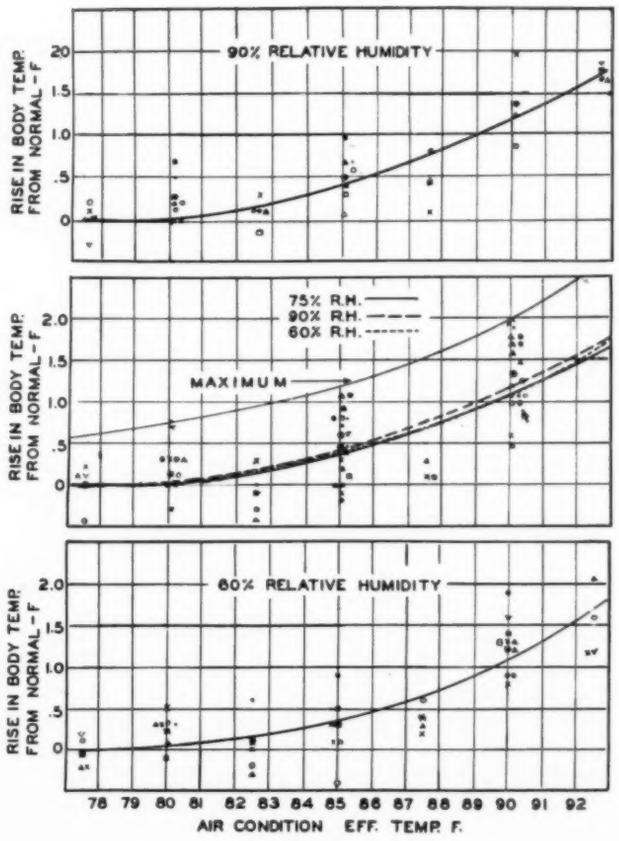
90% RELATIVE HUMIDITY
RISE IN BODY TEMP. FROM NORMAL - F
75% R.H.
90% R.H.
60% R.H.
MAXIMUM
60% RELATIVE HUMIDITY
78 79 80 81 82 83 84 85 86 87 88 89 90 91 92
AIR CONDITION EFF. TEMP. F.

Fig. 1.
Relation between rise in body temperature from normal during 3-hour exposure and the effective temperature of the air condition in the test room for 60, 75 and 90% relative humidities. Test points for individual subjects apply to heavy solid curves.

may be accomplished by ventilation with cooler outside air, by mechanical refrigeration, evaporative cooling, dehumidification, air movement, or by any combination of these air conditioning processes. There are many instances where very few workers are engaged in a hot enclosure of large volumetric capacity, in which the cooling of the entire ambient condition would be very expensive, if at all possible. In an earlier report[3] it was indicated that feasible means for cooling the individual without conditioning the entire surroundings may be found. This may include the cooling of a small booth from which the worker may view the processes involved and by remote control perform his required tasks, or the individual may himself be cooled by directing a blast

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This paper, which was presented at the joint meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS and the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, at Pittsburgh, May 8, 1941, is the result of studies of factors in the application of air conditioning in industry conducted by the Research Laboratory of the American Society of Heating and Ventilating Engineers. The work was carried on through the Committee on Research of the Society under the Technical Advisory Committee on Air Conditioning in Industry, consisting of W. L. FLEISHER, President of the American Society of Heating and Ventilating Engineers, and Chairman; PHILIP DRINKER; DR. LEONARD GREENBERG; H. P. GREENWALD; A. M. KINNEY; J. W. KREUTTNER; L. L. LEWIS; H. B. MATZEN; DR. W. J. MCCONNELL; DR. C. P. MCCORD; P. A. MCKITTRICK; DR. R. R. SAYERS; CHARLES SHEARD; C. TASKER; R. M. WATT, JR.; AND H. E. ZIEL.

of relatively cool air over him, or by circulating cooled air through his clothing. This paper deals with the last two possibilities.

First, this report includes data on the effect of directing relatively cool air at high velocity from a 4-inch nozzle over the worker performing his tasks. Such a method, while requiring a considerable volume of air, offers the individual freedom to step into or out of the blast to accommodate his desires for cooling, and permits him to leave the source of cooling for short periods of time to perform other necessary tasks without restriction.

Secondly, this report offers a limited amount of information on the results of circulating relatively small volumes of cool air through a loose-fitting garment worn by the worker. The latter method carried to its logical conclusion obviously offers the maximum cooling effect with the minimum of cost in cooling or volume of air handled. It restricts, however, to some degree the freedom of the worker and cannot be used if he moves frequently from one place to another over a large area. In many types of activity, where few workers are required in restricted locations in large hot enclosures, and where occasional movement of the worker to a more distant location for short periods of time is required, the hose may be connected by means of a readily detachable coupling permitting the worker to disconnect it, take care of his other duties and return to the cooling.

In any application of cooling to humans the underlying principles involved should be kept in mind. Through the processes of life heat is developed within the body, and in order to maintain the required approximately 98.6° F body temperature, this heat must be dissipated at the same rate. There are four physical principles involved:

1. Heat may be lost from the body to surrounding surfaces in view of it by direct radiation. Heat loss by radiation may be increased by surrounding the worker with cooling surfaces in view of him. Because of the strictly directional character of radiation heat loss and the large area of the cooled surface necessary, this method has seldom been used either in comfort or in industrial air conditioning.

2. Heat may be dissipated from the body by the evaporation of perspiration from the skin surface and, to a lesser extent, of moisture from the respiratory tract. It is largely through these means that physiological control of heat elimination is had.

3. Heat may be dissipated by convection or by transfer from the body to the cooler surrounding air.

4. Air movement is a most important factor in increasing the heat loss either by evaporation or convection.

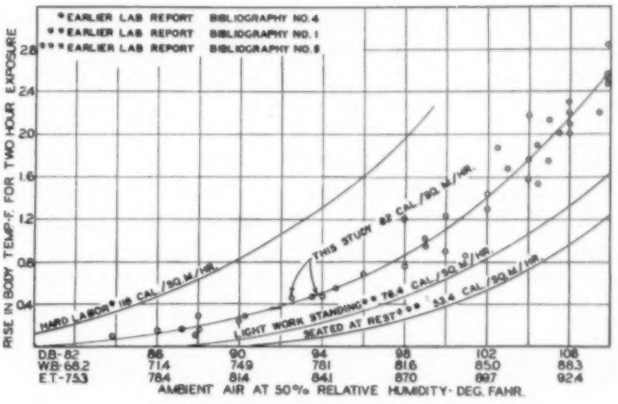
* EARLIER LAB REPORT BIBLIOGRAPHY NO. 4
** EARLIER LAB REPORT BIBLIOGRAPHY NO. 1
*** EARLIER LAB REPORT BIBLIOGRAPHY NO. 5
RISE IN BODY TEMP-F. FOR TWO HOUR EXPOSURE
2.8
2.4
2.0
1.6
1.2
0.8
0.4
THIS STUDY 82 CAL./SQ.M./HR.
HARD LABOR* 116 CAL./SQ.M./HR.
LIGHT WORK STANDING** 78.4 CAL./SQ.M./HR.
SEATED AT REST*** 53.6 CAL./SQ.M./HR.
DB-82 88 90 94 98 102 106
WB-68.2 714 749 781 816 850 883
ET-75.3 784 814 841 870 897 924
AMBIENT AIR AT 50% RELATIVE HUMIDITY- DEG. FAHR.

Fig. 3.
Relation between air conditions and the rise in body temperature of control worker. Curves for other activities given for comparison.

Test Procedure

THE study was made in the two psychrometric rooms of the A.S.H.V.E. Research Laboratory, located in the Central Experiment Station of the U. S. Bureau of Mines in Pittsburgh. Two workers were engaged in light activity in one of the rooms heated to the desired temperature and humidity. Cool air from the adjoining room was blown either over one worker referred to as the "cooled worker" for the blast cooling application, or into his loose-fitting coveralls through an attached 2-inch hose. Fig. 2 shows the "cooled worker" with the hose attached operating the work machine. The other worker referred to as the "control worker" followed the same procedure with the exception that he was not provided with either the cool blast or the cool air in his suit.

Both the "cooled" and the "control" workers were confined to the hot psychrometric room for the duration of the test. They engaged in physical activity by operating the work machine, by pulling the weight 10 times during approximately

Fig. 2.
Subject engaged in pulling the work machine while being cooled in the ventilated suit.

20% of each five minute period. During the remaining 80% of the time the workers were permitted to move about or sit down as they desired.

In the "blast cooling study" the "cooled worker" performed work outside of the cooled blast and then stood or sat in the blast. In the "ventilated suit study" the cooling air was circulated through his suit during both the work and rest periods. Each worker was to continue the test for two hours or until either his body temperature reached 101°F or his pulse rate reached 140 bpm. If either worker had to leave the hot condition before completion of the two-hour period, his two hour temperature rise was computed by assuming the rise proportional to the length of exposure. For many test conditions the control worker had to leave the test room before the expiration of the two-hour

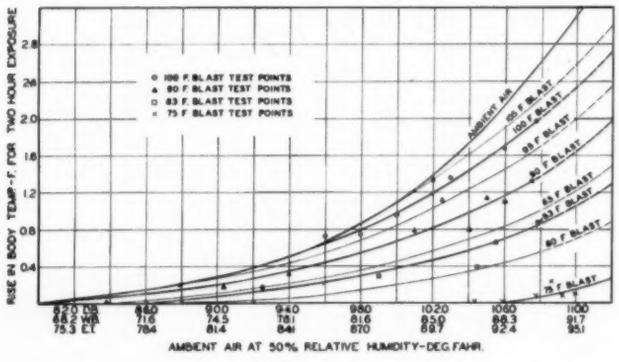
RISE IN BODY TEMP.-F. FOR TWO HOUR EXPOSURE
100 F. BLAST TEST POINTS
90 F. BLAST TEST POINTS
83 F. BLAST TEST POINTS
75 F. BLAST TEST POINTS
AMBIENT AIR
100 F. BLAST
90 F. BLAST
83 F. BLAST
75 F. BLAST
AMBIENT AIR AT 50% RELATIVE HUMIDITY-DEG. FAHR.

Fig. 4.
Relation between air conditions and the rise in body temperature of worker cooled by blast air at 50% relative humidity and various dry-bulb temperatures.

period *and frequently long before the cooled worker found it necessary to leave.* The oral temperature, pulse rate, the degree of perspiration, and other physiological reactions were observed. Earlier laboratory reports[3] indicate that the other physiological reactions are either dependent upon or correlated with the rise of body temperature. Since this rise seems to be the most basic physiological derangement resulting from exposure to heat, it alone has been used to determine the severity of the condition on the worker in this report.

Test Results

THE rise in body temperature of the control worker is plotted in Fig. 3, indicating that for this rate of work a rise in body temperature begins at about 80°F dry-bulb with 50% relative humidity, or 74° effective temperature. At 90°F and 100°F dry-bulb with 50% relative humidity, the rise in body temperature for a two-hour exposure averages 0.3° and 1.1°, respectively.

There are also plotted in this chart the rise in body temperature found in earlier studies for men engaged in heavy work[4] (a metabolic rate of 118 calories per square meter per hour); men engaged in very light work[1] (a metabolic rate of 76.4 cal. per square meter per hour); for men seated at rest[5] (a metabolic rate of 53.4 cal. per square meter per hour). The rise in body temperature for a person seated at rest but clothed in a heavy fur overcoat is also given. All of the different curves, with the exception of the one for the man with heavy clothing, logically indicate that the greater the degree of activity or the higher the metabolic rate the greater the body temperature rise in a given environmental condition.

The curve for the control subject, as plotted with the test points in Fig. 3, is shown for comparison in Fig. 4 together with the rise in body temperature of the cooled worker in various ambient conditions and with blast temperatures of 100°F, 90°F, 83°F, and 75°F dry-bulb temperatures and 50% relative humidity. As is the case in most laboratory studies of the physiological response of workers, the points show considerable variation, indicating a band rather than a curve relation. However, a single curve representing

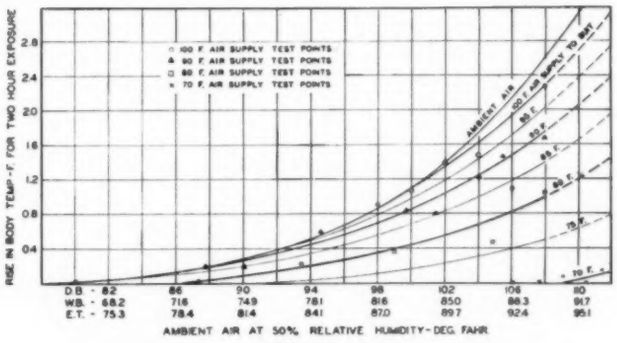
RISE IN BODY TEMP.-F. FOR TWO HOUR EXPOSURE
100 F. AIR SUPPLY TEST POINTS
90 F. AIR SUPPLY TEST POINTS
80 F. AIR SUPPLY TEST POINTS
70 F. AIR SUPPLY TEST POINTS
AMBIENT AIR
100 F. AIR SUPPLY TO SUIT
90 F.
80 F.
70 F.
AMBIENT AIR AT 50% RELATIVE HUMIDITY-DEG. FAHR.

Fig. 5.
Relation between the air conditions and the rise in body temperature of worker cooled in ventilated suit, with ventilating air at 50% relative humidity and various dry-bulb temperatures.

the average results is drawn for each blast temperature studied together with intermediate curves found by interpolation, giving a series of curves for blast temperatures ranging from 105°F down to 75°F.

The data obtained for the worker cooled by air blown through his suit are given in Fig. 5 in a manner similar to those for the worker cooled by a blast in Fig. 4. The curve for the control worker as plotted in Fig. 3 is also shown for reference. Data were collected for 100°F, 90°F, 80°F, and 70°F dry-bulb cooling air temperature. These curves are expanded into a series giving cooling effect from 100°F to 70°F dry-bulb temperature at 50% relative humidity.

Figs. 4 and 5 show the relation between the rise in body temperature of workers and a wide range of cooling air and ambient temperatures. If the allowable temperature rise in a worker during the two-hour work period is assumed to be ½°, then without cooling a man may be expected to work in an atmosphere of 94°F dry-bulb and 50% relative humidity while for blast air temperature of 95°F, 90°F, and 80°F he may work in environments of 95, 98, and 108° dry-bulb, respectively, at 50% relative humidity. With a blast air temperature of 75°F with 50% relative humidity, he may work in an environment up to 106°F dry-bulb and 50% relative humidity with no expected temperature rise, and in higher temperatures with modest rises.

The results as plotted in Fig. 5 show that for a worker having cooled air blown through his suit under the arrangement used in this study the air must be slightly cooler than that found for the blast cooling method. However, it should be pointed out that 11 times as much cool air was used with the relatively large blast nozzle as was blown through the suit, hence indicating considerable saving in the total volume of air cooled and handled.

In considering the data plotted in Figs. 4 and 5, it should be emphasized that widely different performance may be expected, depending upon variations in the practice in handling the cooled air, thus, if larger volumes of air were supplied, either through the blast or through the clothing, the subjects could either work in a hotter ambient condition or more comfortably in the same ambient condition, while if the air were cooled to a lower level the same could be realized. Undoubtedly the condition of the clothing worn has a great deal to do with the results obtained. However, unless too severe conditions are encountered the worker will object to wearing heavier clothing. For most conditions the light coverall garment used in this study is probably the most suitable. However, if the worker is to be engaged in a very hot environment, particularly one accompanied by a great deal of radiant heat, the required cooling might best be realized by clothing the men with considerable insulation (clothing) placed outside of the more or less air-tight and loose-fitting suit.

It was found in this study that the worker did not object to cooling air blown through his suit so long as its temperature was not below 75°F. For air temperatures below 75°F it was found desirable to cover that portion of the worker's back against which the entering air was directed, with a fairly heavy pad; a double thickness of a fairly heavy weight turkish towel was found to suffice for this purpose. If this pad covered approximately a square foot of the worker's back against which the current of air was directed he did not object to the chilling effect.

In supplying the worker with a cooled blast of air, the larger the cross-sectional area of the blast, or the higher the velocity, the greater the cooling effect. The four-inch diameter jet used in this study was found to be sufficient in all cases to keep the worker's body temperature normal, provided the blast of air was sufficiently cooled. The workers generally objected to having the blast of air blown over their faces. The best results were found when the blast of air struck the worker over the shoulder, with the center of the axis of flow directed diagonally across his body so that the cool stream enveloped most of it. It was found that such a blast of air rapidly mixes with ambient air, with a resulting rise in temperature. Hence, it is necessary to keep the source of the blast as near the worker as possible. Larger blasts affecting more than one worker may be used, with lower efficiency of the results obtained for a given rate of cooling or of air handled.

In any hot industry radiant heat may be an important factor which will adversely affect the relationships shown in Figs. 4 and 5. However, provisions for these changes may be made by lowering the temperature of the cooling air; or by increasing its volume; or in cases where the air is blown through the suit, by increasing the insulation outside of the air-tight ventilated garment.

For some types of activity the application of the hose to the suit at the center of the back may not be most satisfactory. However, it is believed that with most types of activity this would be the optimum location. When the worker was seated, it was found that attaching two hoses, one to the bottom of each pants leg, was very satisfactory, thereby permitting the air to flow upward through the suit with exit around the neck. A practical difficulty is realized with a seated worker when the air is admitted to the back due to the fact that it cannot easily flow downward. Most of it short circuits upward and out around the neck, giving little cooling effect to a large part of the body surface.

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The Medical Bulletin

Review by

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THERE has been a steady advance in the scope of the Standard Oil Company's (New Jersey) medical interests since the inception of the medical department on June 1, 1918, when DR. WILLARD DENNO was appointed Medical Director, with DR. W. GILMAN THOMPSON as Medical Consultant (the same DR. THOMPSON who wrote the large volume, *The Occupational Diseases*, 1914). Two years later, DR. A. W. SCHOENLEBER assumed the duties of Assistant Medical Director. At the present time there are 109 full-time, 28 part-time physicians, and 110 appointed medical examiners stationed throughout the more important oil producing and manufacturing areas of the world.

Upon the occasion of the 23rd Anniversary of the Medical Department, an Exhibit was prepared

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(and shown) at the 1941 Meeting of the American Medical Association—charts, maps, photographs, diagrams, etc., which are reproduced in the present Bulletin.

DR. R. C. PAGE presents the *Story of the Exhibit* which was conceived to illustrate the part played by each unit in the vast medical organization for the welfare and care of the employee. In many respects the employee is more closely related to the medical department than he is to any other department in the company. Sick people—mentally and physically ill—speak more freely to the doctor than to any other individual. This paves the way in many instances of misunderstanding for a congenial relationship between employee and management.

Today when a man becomes an employee of the company, full burden of his health is accepted until he resigns, retires or dies. In foreign fields, not only the employee but his wife and family as well are fully cared for.

Fifteen charts express the facts in a practical and explicit manner, each one illustrating a particular phase in the realm of Industrial Medicine as it applies to the organization.

In the central panel or theme, a medical unit comprised of a doctor, nurse, chemist, first aid man, safety man and sanitary inspector, is visioned as the sun overshadowing the entire world. In the background an etching of 30 Rockefeller Plaza is seen because here the administrative offices are located. From the 24th floor a ray of interest likewise spreads over the entire world. In the central portion the figure 186,344 denotes the number of individuals who come under the direct supervision of the Medical Department. A beam shows these individuals scattered throughout the entire world, from Australia to Chili, from Sumatra to Africa, and from England to Italy. Whereever oil is produced, refined or sold, invariably someone directly associated with the company will be present. In the background, etchings of individual men and women appear. These are meant to portray a few of the 500 different types of occupations which are performed by employees in the oil industry. The hazards associated, the exposure involved, the physical and mental requirements must all be of first hand knowledge to the doctor. With such awareness he is able to protect the employee's medical well-being to a maximum.

A chart shows the geographic locations of medical personnel—640 total, plus 1,010 examiners on a fee basis, 32 hospitals, 1,041 hospital beds; another, the exact locations of full-time medical units, the number of medical personnel, the hospital beds available and the number of people served at each location; another, the functional administration of the medical department and its coordination with the library, medical records and research with a vast amount of medical material available and being gradually prepared for publication; another, preventive medicine with routine procedure, typical results and typical research. (Here water-borne and food-borne diseases, malaria, influenza and researches on hypertension appear.) Another chart covers sanitation in tropical countries, with diagrams and photographs; another, refinery operations at Baton Rouge, Louisiana; another, the producing and pipe line companies for the year 1940; another, vital statistics (topographical and geographical); another, marine operations; another, the medical organization of natural gas subsidiaries (New York, Pennsylvania, West Virginia, Ohio); another, with photographs, the hospital facilities available without cost for employees and their families (tropical countries). A chart of Venezuela and the Caribbean Sea, with photographs, illustrates the arrangements for transportation of the sick and injured in tropical countries by boat, automobile, railroad and aeroplane. A map and photographs illustrate the medical service of producing companies in tropical countries with statistics on endemic disease rates and preventive measures. The final chart comprises 17 photographs of miscellaneous medical activities in tropical countries—education, recreation and athletics. Recently, medical service has been installed for employees in the sales organization, with special papers in the Bulletin devoted to this subject.

In his final comment reviewing the history of the company's medical organization, DR. PAGE, as Editor, concludes "Industrial Medicine as practiced by our organization is a comparatively new field and the road traversed along the years has been over a rocky and difficult terrain. Pioneering was and still is necessary. Difficulties only spur our doctors to further effort. They are ever striving toward the ideal of preventing disease and reducing disability. While the goal of perfection can never be reached, every effort is destined to lead them onward and upward towards this star of achievement."

MEDICAL *Statistics for 1940* is a 21-page article by DR. A. W. SCHOENLEBER. These are based on one or more calendar days of disability for the past 20 years. During the year 1940, a total of 129,166 persons came under direct supervision of the Medical Department. Defining a disability case as one sufficiently incapacitated to require confinement to hospital (or quarters), for one or more calendar days, the total number was 50,449 as compared with 45,095 in the previous year. Hospital admissions totaled 19,595. The locations of hospitalized cases show United States 8%, tropical countries 44% and European countries 18%, the total (9,410) being 26% of the disabled cases. A total of 5,330 operations was reported for the entire group under consideration (employees, their families and "others"). Employees were disabled a total of 372,569 calendar days. The average days of disability per employee were 4.23 in tropical countries, 5.42 in European countries, and 6.31 in the United States (1940), the trend being upward since 1936 for the United States, less so for tropical countries, and downward for European countries. The average daily number of employees per 1000 who were disabled because of sickness or injuries (the non-effective rate) for 1940 was 14.21, an increase of 8% over the previous year, with the United States leading (17.29), European countries next (14.84), and tropical countries lowest 11.59).

There follow tables and some charts with explanations covering employee frequency rates (1940) for sickness, non-industrial injuries and all injuries—increased 14% over the previous year, and sickness frequency rates by the different systems of the body and for important diseases such as the common cold, influenza, malaria, water-borne diseases (important in the tropics), minor gastro-intestinal diseases, and appendicitis. There was a total of 915 deaths, the annual rate being 2.98 per 1000 as compared with 3.35 in 1939, while the rate for industrial injuries was .14 compared with .42. The chief causes of death, in descending order, were cardiovascular, digestive, respiratory, musculo-skeletal, urogenital and general. During the past seven years each year has shown an increase in the employee frequency rates of disability. Many factors are involved in this increase—not all of which can be easily accounted for—such as the addition of new companies which had much higher frequency rates, a sharp increase in 1939 from respiratory diseases, notably the common cold and influenza, which prevailed even worse in 1940, the liberalization of sickness benefit plans, etc. The same upward trend was true in the tropics. Part of the increase has been of minor conditions presenting primarily subjective symptoms. Exprience shows that, at first, new groups report only for serious conditions. After a number of years of contact with medical service, they begin to complain of minor conditions which increase the rates. It is thus a change in attitude.

In addition to the figures briefly mentioned above, DR. SCHOENLEBER states in his summary that, in full-time medical staffs, 364,065 cases were treated in the company dispensaries, with 944,119 dispensary treatments. There were 3,204 operations in company hospitals, 54,315 physical examinations, and 15480 x-ray examinations. For the tropics these services also included the employees' families, and often others not in any way connected with the company. It should be kept in mind that in the United States, in Europe and in the Tropics many go to their own doctors. Only in isolated localities are hospitals maintained which give full-time professional services. "In other locations where there are plants of sufficient size to justify the employment of a full-time doctor, we render the type of

medical service usually considered indicated under the term 'Industrial Medicine'." A final table gives a statistical summary by companies—employees only—thus refineries in Bayway (New Jersey) may be compared with those in Baton Rouge, each having about the same number of employees. Following the two reports, the Bulletin is made up of special papers by Company doctors in various parts of the world.

DR. I. L. GEORGE, Baton Rouge, La., gives a *Summary of Medical Activities*, 1940: Pre-employment, lay-off and periodic examinations, sickness cases, non-industrial injuries, care of industrial injuries and the prevention of occupational diseases, preventive medicine, health preservation measures (with educational bulletins), first aid, marine work and miscellaneous, with an accompanying summary table. He notes a tremendous increase in sickness frequency rates for 1940, definitely attributable to two outbreaks of influenza and upper respiratory diseases, these being the company's biggest problem. Industrial injuries and occupational diseases seem to be well under control.

DR. W. S. CRAWFORD, Tulsa, Oklahoma, reports on the *Medical Service in the Producing Field, the Carter Oil Company*, with a history of organization—the company having been incorporated in May, 1893, for the purpose of producing oil in the State of West Virginia, followed by extensions to Oklahoma and Kansas in 1913, with a discontinuance of the Eastern Division in 1925. Subject headings follow more or less those of the preceding paper, with additional topics of toxic substances, Rocky Mountain spotted fever, smallpox, diptheria, and stress on water supplies. This company also has a sickness and accident benefit plan with fee arrangements explained. There is also a discussion of compensation cases. "All employees, regardless of what health problem they may have, are encouraged to consult this department at all times." A case is described of a small boy unable to talk or open his mouth, who had been in this condition since one year of age, at which time he suffered with an abscess in the mastoid region and his jaws became ankylosed. He had been fed through an aperture where a tooth had been removed. With the parents' approval, an operation was arranged with a noted surgeon, at a minimum cost within the financial means of the family, and a year later the boy was found to be normal in every way.

DR. F. L. VASSALLO, Manuela Pedraza, Argentina, reports for the *Marketing Division, Buenos Aires Medical Department*, organized in 1938, and affecting the West India Oil Company at approximately 46 locations. The organization, functions, medical injuries, beginning of medical work in Buenos Aires, part-time doctors, "losing-time" cases, insurance company versus medical department, sickness abuse, control of "losing-time" cases, and the gradual development of personnel (only a few of whom are full-time) with the aid of 46 part-time physicians on a fee basis, are matters of concern and report. The desire for a change from the part-time fee basis to a part-time salary basis is advised with the ultimate end, a full-time basis.

DR. E. E. BREWER, Buenos Aires, Argentina, reports a *Health Survey of the Physical Condition of Employees of the West India Oil Company and Affiliated Companies*. In Argentina, Uruguay and Paraguay, 75.13% of the employees are natives of these countries. A code table of the 29 most common afflictions was devised and followed through, with the number and percentages of afflictions found under each. Educational bulletins were prepared. Where persons with colds and influenza have been invited to report to the medical department for preventive or curative treatment, those with bad teeth are urged to seek a dentist. The chief defects were dental (32.28%), visual (30.40%), common cold (30.35%), obesity (21.99%), gastrointestinal (21.26%), and diseases of the nervous system (20.27%), while menstrual disorders were elicited in 53 of the 145 female employees (36.35%). The average age of personnel was 37 years.

THE MARINE MEDICAL SERVICE is reported upon by DR. J. G. HEWITT, Bayonne, New Jersey. This service was established in 1920 and first involved the sea-going personnel on approximately 44 tankers, finally reaching a total of 71 vessels under the American flag. To this in 1930 was added the Marine Department of Socony Vacuum Oil Company with approximately 40 ocean-going tankers, 26 tug boats, 153 barges and 18 motor barges—all coming under the care of the Medical Department. In 1939, 41 Panama Transport Company vessels were shifted to New York, bringing added medical responsibilities. One of the first important services was the examination by a boarding doctor of all cases of sickness and injury that had occurred to members of the crew on the completed voyage. From this the seamen have learned to consult the doctor readily, considering him to be "medical adviser" instead of "company doctor." Radio requests for medical aid are received. Where immediate attention is needed, the ship is boarded on arrival regardless of the time. While minor cases are treated on board, the more serious conditions are admitted to the U. S. Marine Hospitals. The boarding doctor must be possessed of keen diagnostic ability, as in most cases the vessels remain in port only 24 hours. Thus 1034 vessels were boarded in the port of New York in 1940, requiring the greater part of one physician's time in the performance of this task. The boarding doctor gives special attention to the ship's medical sheet, something often commented upon by visiting physicians. On one occasion, the SS Esso Baytown rescued the crew and passengers of the Imperial Airways Flying Boat "Cavalier" at sea in February, 1939, and the medical department ashore knew with satisfaction that ample medical supplies were on board for any use that might be indicated. Physical examinations involve all licensed officers and technical personnel of the New Jersey fleet. Close cooperation is had with the Marine Annuities and Benefits Department. The shore personnel is also examined and treated in the Bayonne Division. In New York, pre-employment and post-vacation examinations are made. Since the adoption of the Disability and Death Benefit Plan, which does not disqualify a patient from sickness benefit when suffering from venereal disease, a vigorous campaign has been begun on venereal prophylactics to reach every seaman. Calomel ointment prophylactic tubes are distributed on all vessels, and sulfathiazole is replacing sulfanilamide in all the ships' medicine chests. In this way, gonorrhea, chancroids and buboes may be effectively treated by the Master as soon as any of these conditions develop. From the medical standpoint, one of the chief functions of the Esso Tanker Fleet is the transporting of supplies to Aruba (Danish West Indies), including household and office equipment, as well as 90% of the water supply and practically all articles of food, while the medical staff at Aruba plays an important role in the care of marine personnel who have become sick or injured while enroute. A table shows the statistics of medical performances for the years 1936-1940.

PERIODIC MEDICAL SERVICE IN THE SALES ORGANIZATION, STANDARD OIL COMPANY OF NEW JERSEY, is reported by DR. R. P. SIM, New York City. A recent development requires a full-time company doctor instead of local examiners working on a fee basis. Examinations are conducted in the plants, wherever these may be. The exact medical equipment is specified, for much of the work must be an ambulatory basis. Various findings are recorded, as well as discussed with the examinees, with an educational point of view in mind. The periodic examination is particularly stressed.

THE final article (outside of staff news) illustrates the versatility of the Bulletin by calling attention to a rarely reported but common gaseous poison, in this instance occurring in connection with the "cracking" of fuel oil to produce naphtha (gasoline). We think it worth some detail. It concerns *A Case of Poisoning with Mercaptans*, by DR. VASILE CRISTESCU, Ploesti-Teleajen, Roumania. In his introduction the author discusses the use, toxicity and routine precautionary measures to be taken with these organic compounds of sulphur which are analogous to

alcohols. They are found in man in the putrefaction of albuminoids in the intestine and give the characteristic odor to urine after ingesting asparagus.

The case in point involved a workman who, disregarding orders, descended into a pit about 6:00 P. M., not being noticed, and was found two hours later at the bottom of the pit, seated on a chair and leaning against the wall, completely unconscious. At the hospital he was found in a state of coma, exhaled a very strong odor, showed cyanosis but with normal breathing, general muscular contraction with trismus, and general convulsions from time to time. He was cold. The pulse was regular at 120. A loud rhonchus made auscultation impossible. Other organs appeared without significance. A phlebotomy of about 300 gr. was made immediately. Cardiazol and physiological serum were administered. The cyanosis disappeared about five hours later and at about 5:00 A. M. the next day he regained consciousness, but remembered nothing of his movements in relation to entering the pit. Temperture followed the next day (to 38.8°), urine negative, blood urea 0.64, leucocytes 16,000 with 84% polys. On the sixth day the patient left the hospital apparently completely cured.

Several days later he started to perspire, developed a slight pain in his right side, effort tired him, and he coughed from time to time without expectorating. On the 16th day, from date of mishap, he was taken with a violent cough for about five hours and expectorated a fetid, fairly abundant material, and showed febrile symptoms with respiratory findings. A radioscopic examination showed, under the right clavicle, the impression of an abscess of the lung, the size of a large walnut, with connecting streamers to the hilum. He was given intravenous injections of 33% alcohol for 10 days, also antigangrene serum sub-cutaneously (280 cc. in seven days), expectorants and hyposulfite of sodium. The fever, which had reached 39.5°, fell back to normal at the end of eight days and the expectoration diminished in 10 days to 50 cc. Thirty-two days after the date of exposure he ceased expectorating. His general state improved every day and he left the hospital completely cured.

The author presents literature citations (chiefly animal experimentations) and debates the question of correlation between the abscess and the poisoning with mercaptans, and feels that it was a coincidence only, although the problem remains open.

THE MEDICAL BULLETIN appears irregularly but averages about half a dozen issues a year. It is a leading example of how several industries (we are sorry not to say *many* industries) are analyzing themselves in the field of industrial medicine and health economy and, at the same time, freely publicizing their findings so that good may redound universally.

O. D. Information Service

THE Occupational Disease Information Service published by the Industrial Hygiene Service Bureau, Inc., 166 W. Jackson Blvd., Chicago, is a cumulative looseleaf binder service, covering the four main principles of industrial hygiene information: (1) Materials, Substances, Conditions; (2) Typical Processes; (3) Diseases or Physical Effects; and (4) General Control Methods and Miscellaneous Data.

As stated in the foreword of the first volume: "Because of the decided increase in the number of laymen and scientists seriously interested in the detection, evaluation, and control of occupational disease hazards, there has been a growing demand for a single reference system in which data from the various essential sources are combined and correlated in compendium form. Recognized as a subject requiring cooperative endeavor in the accumulation of essential information, the chemist, hygienist, engineer, physician, researcher, geologist, and others have been supplying contributory data. Unfortunately, however, this varied information all too often lacks proper relationship and, moreover, is contained in widely scattered references."

The Industrial Hygiene Service Bureau, acting as a central clearing agency, collects and correlates all essential data, under the four headings named, publishing them in concise, practical form as the "Occupational Disease Information Service."

Material is filed consecutively, as periodically issued, in a three-ring binder, taking 8½ x 11 sheets, is published on a volume year basis, April 1 to March 31, inclusive; is cumulative, and is priced at $25.00 per yearly subscription.

For those who must deal with the engineering, medical, and medicolegal aspects of industrial hazards and exposures, this cumulative looseleaf service represents an encyclopedia of information otherwise unobtainable in a single volume. It will be of valuable assistance to the physician, safety engineer, industrial hygienist, insurance inspector, attorney, and industrialist.

Trends in Occupational Disease

—*and Industrial Hygiene*—

F. S. MALLETTE *and* H. B. MELLER
Industrial Hygiene Foundation
(formerly Air Hygiene Foundation)

THE volume of the literature of a science can be considered as a measure of the interest in that science. Such a "yardstick" is here applied to industrial hygiene and occupational diseases. During compilation of a four-year index for Air Hygiene Foundation's monthly bulletin, variations in the number of published articles on different subjects were noted. A quantitative evaluation by subject and by year of these variations was first planned for only a four-year period, but was later expanded to include the six years from 1935 to 1940 to afford better comparisons. During these years, industrial hygiene has shown its greatest and most rapid development and has produced voluminous literature. To insure the completeness of this review, the index of the Air Hygiene Foundation's monthly bulletin was supplemented by that of the *Journal of Industrial Hygiene*. Thus two comprehensive sources of material were utilized. Only articles that had been deemed of sufficient importance to be abstracted in these two publications have been counted; they cover material that has appeared in over 285 journals in this country and abroad.

This is a preliminary study intended only to discover and present the changing patterns of interest as revealed in the literature on industrial

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hygiene and occupational diseases in the past six years. It is a common observation that there is a continual shift in emphasis on various subjects within a science. This may be due to any of a large number of influences. New laboratory methods useful for exploration of a given field, recognition of new health hazards which demand study, and numerous other influences.

The figures here presented are analogous to reports of the Census Bureau which give the population of the whole country and of the larger cities from which shifts can be deduced. Using the indexes of the literature, the number of articles on some 15 subjects were enumerated and tabulated for each year of the six-year period. This material could be broken down in a number of ways. We present certain simple graphs to illustrate the variations under each subject heading.

In Fig. 1 is shown the total population, so to speak. This presents the total mass of the literature as it was recorded in the indexes of abstracted articles for the period 1935-1940. Interest in the field, as evidenced by the published material, increases with the years from 1935 to 1938 and 1939 and then levels off to reveal a constant and steady output. The year 1941 will, no doubt, show another upsurge in pubications, brought about by the new problems of national defense with the increased production, new processes and materials, and the expansion of industrial hygiene personnel. Just such a change already has been commonly observed.

Fig. 2 represents the results of a numerical count of articles on a number of subjects appearing in the world literature for the years 1935-1940 arranged in descending order of importance. Importance here is taken to mean the number of articles which have been published on a given subject.

By its bulk, the subject "Dust" leads the array, followed closely by "Lead" and "Silicosis." The vertical dividing bars separate the material by years within each subject, and it is readily seen that these vary considerably from year to year. The fluctuations suggested other graphs which reflect the yearly changes in a more evident manner.

Figs. 3 to 11 present an analysis of the various subjects determined by count to be the most important for the several years under scrutiny. The bar graph in Fig. 3 shows the fluctuations in amount of published material on the general subject of "Dust" appearing in the world literature. There is an increase from 1935 to a peak in 1937 and 1938 and a definite decrease from that time until last year. What do these fluctuations signify? The early increase parallels the rising interest in the general subject of industrial hygiene, but what meaning can be applied to the noticeable decrease in interest in this subject for the past two years? Are there fewer problems due to better control? Is this decrease due to increased interest in other subjects in industrial hygiene or actual lack of interest in the subject of dust itself? Have the limits of the available techniques been reached? It will be recalled that further advances in the field of microscopy were limited by the inherent characteristics of the optical microscope. The discovery of the electron microscope will rejuvenate progress in this field. Perhaps this innovation will again bring about interest in the subject of dust and with it an increase in the number of pubications on that subject.

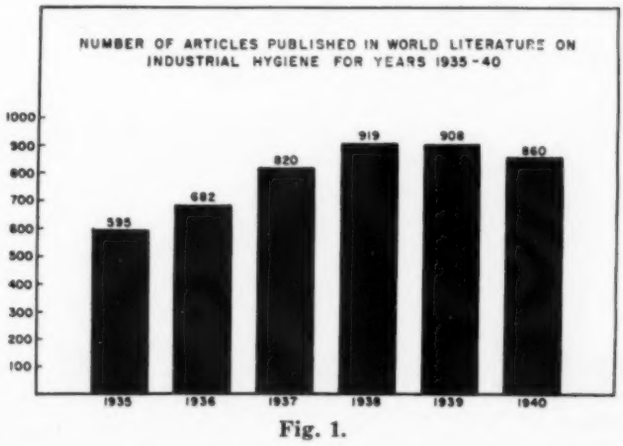

Fig. 1.

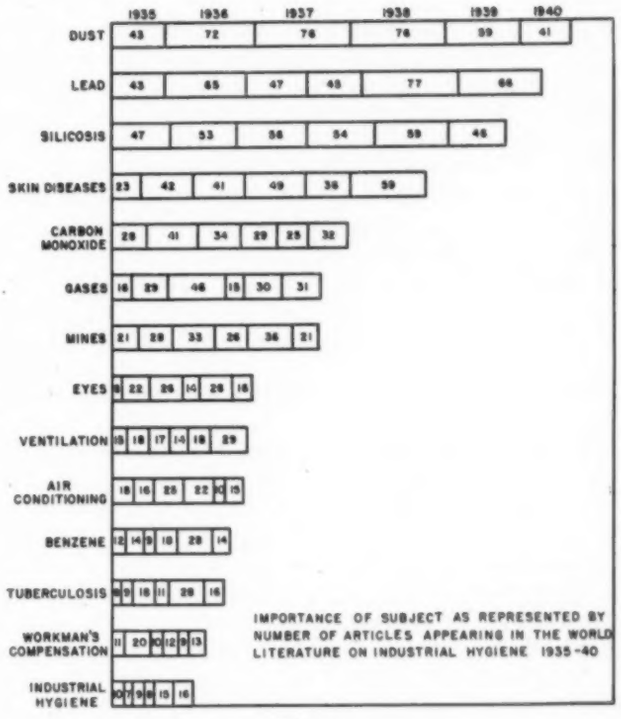

Fig. 2.

The graph in Fig. 4 represents the changes from year to year in amount of published material on the subject of "Lead." Here is seen an early rising interest followed by two years of somewhat lessened attention. Then, in 1939, there was a 60% increase in the number of articles written on this subject. In 1940 another drop brings the level back to that of 1936. Here again are interesting fluctuations.

Fig. 5 presents the same story for the subject of "Silicosis." This graph discloses a relatively unchanged level of fairly heavy volume maintained for the entire period of this review.

The changes in interest in the subject of "Skin

Diseases" are presented by Fig. 6. The trend is generally upward except for the marked drop in 1939 with a following sharp rise in 1940. On the whole, interest in this subject as evidenced by published material is on the increase.

Fig. 7 is a graph of the yearly tabulation of the articles on the subject of "Carbon Monoxide." The year 1936 shows a sharp increase over the preceding year, then there is a steady decline for three years with another upswing in 1940.

"Gases" (Fig. 8) shows a sharp rise for the first three years of the period, a very marked decline in interest in 1938 and a doubling from that year in 1939 and 1940. This subject includes all gases not specifically mentioned under separate headings.

The levels of the first and last years of the graph for the subject of "Mines" (Fig. 9) are the same. Between them is an up-and-down swing of no great significance, since the range is small.

Dropping down the list of subjects to that of "Ventilation" (Fig. 10), the output here is seen to be fairly level for five years with a definite increase in volume of literature for last year.

The general subject of "Industrial Hygiene" (Fig. 11) shows a fairly level output from 1935 to 1938 with an increase to practically double for 1939 and 1940. This follows the general pattern for the literature on the subject as a whole and would be exactly what might be expected.

Conclusion

IT WILL be seen from these figures that the four subjects receiving the most attention in the literature are: Dust, lead, silicosis, and skin diseases. These have varied in apparent importance among themselves from year to year, but as a group in each of the six years the four have continued to lead the field.

It would appear that interest in dust generally is diminishing, that a relatively constant attention is focused on silicosis, and that, on the whole, the subject of skin diseases is crowding forward. In a less marked manner, the subject of ventilation seems to be attracting increased interest.

For the total period under consideration, the general subject of industrial hygiene manifests a definite upward trend, showing an increase for every year since 1936.

This study marks a beginning—its continuation and expansion are planned in order to determine as far as possible the answers to the questions that arise as to the causes of the variations which have appeared thus far.

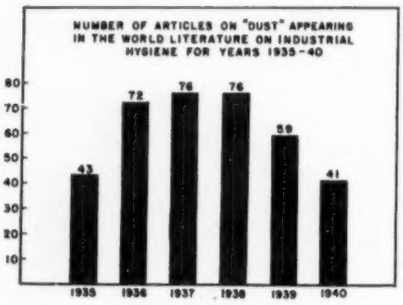

Fig. 3. "Dust"

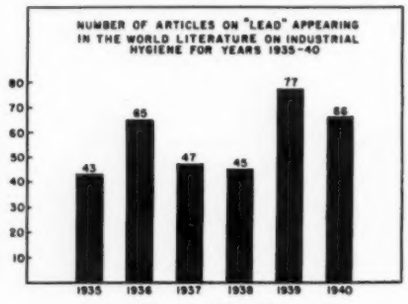

Fig. 4. "Lead"

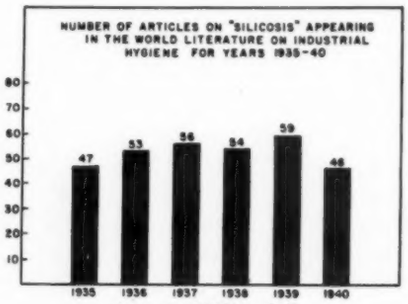

Fig. 5. "Silicosis"

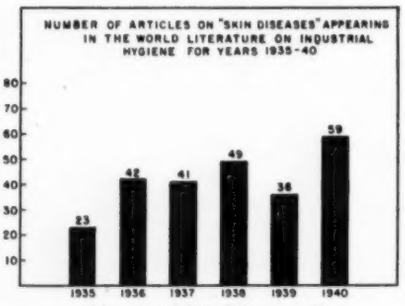

Fig. 6. "Skin Diseases"

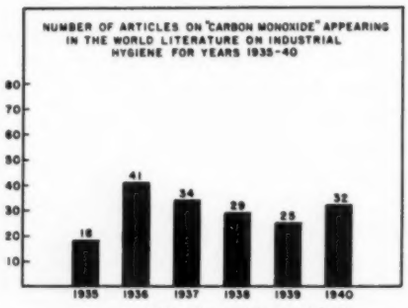

Fig. 7. "Carbon Monoxide"

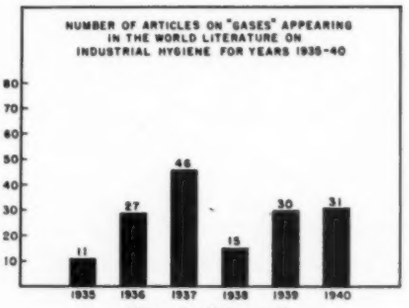

Fig. 8. "Gases"

Fig. 9. "Mines"

Fig. 10. "Ventilation"

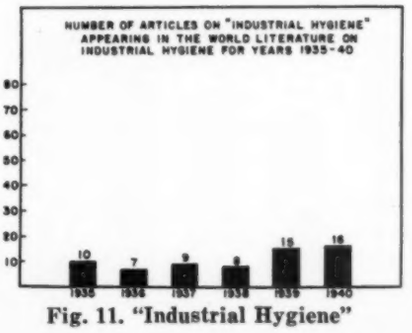

Fig. 11. "Industrial Hygiene"

Railway Surgery

THE AMERICAN ASSOCIATION OF RAILWAY SURGEONS held its Fifty-Second Annual Meeting at the Palmer House, Chicago, Monday, Tuesday and Wednesday, September 8, 9 and 10, with the Surgical Departments of the following railroads participating: Alton, Santa Fe, Baltimore & Ohio, Canadian National, Burlington, Great Western, Milwaukee, Rock Island, Northwestern, Erie, Grand Trunk, Illinois Central, Soo Line, New York Central, Nickel Plate, Pennsylvania, and Union Pacific, together with the Surgical Departments of the Pullman Company and the Railway Express Agency.

The Local Committee of Arrangements, under the Chairmanship of DR. A. R. METZ, included DRS. G. G. DOWDALL, D. B. MOSS, T. R. CROWDER, I. S. CUTTER, O. H. HORRALL, E. C. HOLMBLAD, and T. L. HANSEN. The registration was considerably larger than at previous meetings. DR. LUCIEN STARK, President of the Association, and DR. J. L. CROOK, Vice-President, presided at the sessions.

The program follows:

Monday, September 8, 1941

DR. LUCIEN STARK, Norfolk, Nebraska, President, AMERICAN ASSOCIATION OF RAILWAY SURGEONS, presiding:

"Discussion and Demonstration of Treatment of Painful Backs due to Myositis, Fascitis, and Neuritis"—DR. JAMES F. DePREE, Assistant to Chief Surgeon, C.M. St. P. & P. Railroad, Chicago, and DR. JOHN E. NILSON, Physiotherapist, Chicago.

"The Treatment of Burns"—DR. STANLEY J. SEEGER, Consulting Surgeon, C.M. St. P. & P. Railroad, Milwaukee, Wisconsin.

"Continued Disability Following Cholecystectomy: Explanation and Management"—DR. R. RUSSELL BEST, Associate Professor of Surgery, University of Nebraska Medical School, Omaha, Nebraska.

"Pitfalls in Interpretation of X-Ray Films of Bone Lesions"—DR. JAMES T. CASE, Consulting Roentgenolgist, C.B. & Q. Railroad, Chicago.

"The Heart in Industry"—DR. J. ROSCOE MILLER, Consulting Internist, C.B. & Q. Railroad, Chicago.

"Chemo-Therapy: Sulphonamide Group" — DR. M. HERBERT BARKER, Associate Professor of Medicine, Northwestern Medical School, Chicago.

"Tendon Suturing" — DR. SUMNER L. KOCH, Associate Professor of Surgery, Northwestern University Medical School, Chicago.

"Fractures of Both Bones of the Leg"—DR. ALFRED J. BROWN, Surgeon, C. & N.W. Ry., Omaha, Nebraska.

"Results of Periodic Physical Examinations"—DR. R. M. GRAHAM, Chief Medical Examiner, Pullman Company, Chicago.

"Innomino-Abdominal Amputation, with Report of a Case"—DR. A. H. WHITTAKER, Detroit Area Surgeon, Railway Express Agency, Inc., Detroit.

"Radium Treatment of Angiomas"—Motion Picture in Color. DR. FRANK E. SIMPSON and DR. J. ERNEST BREED, Chicago.

Tuesday, September 9, 1941

DR. J. L. CROOK, Jackson, Tennessee, Vice-President, AMERICAN ASSOCIATION OF RAILWAY SURGEONS, presiding:

"Carpal Injuries"—DR. JAMES J. CALLAHAN, Consulting Surgeon, Illinois Central System, Chicago.

"Repair of Facial Injuries"—DR. JOSEPH E. SCHAEFER, Consulting Oral and Plastic Surgeon, Illinois Central System, Chicago.

"Arteriosclerotic Vascular Disease" — DR. CARL A. JOHNSON, Associate in Medicine, Northwestern University Medical School, Chicago.

"Hiatus Hernia" — DR. N. C. GILBERT, Consulting Internist, C.R.I. & P. Railway, Chicago.

"Skull Fractures and Brain Injuries: Report of a Nationwide Survey, 1935-1940" — DR. HARRY E. MOCK, Consulting Surgeon, C.R.I. & P. Railway, Chicago.

"Peptic Ulcer"—DR. W. J. WALKER, Assistant Surgeon, A.T. & S.F. Railway, Topeka, Kansas.

"Skin Diseases Common to Railway Employees"—DR. E. H. DECKER, Dermatologist, A.T. & S.F. Railway, Topeka, Kansas.

"Fractures of the Patella"—DR. J. E. M. THOMSON, Local Surgeon, C.R.I. & P. Railway, and DR. CHARLES F. FERCIOT, Lincoln, Nebraska.

"Newer Methods for the Repair of Inguinal Hernia"—DR. SPENCER WRIGHT, Surgeon, Union Pacific Railroad, Salt Lake City, Utah.

"Opportunity of Company Doctor"—DR. R. M. SHEA, Surgeon, Union Pacific Railroad, Denver, Colorado.

"Can the Relations Between the Employees and the Examining Surgeon Be Improved?"—DR. CHARLES E. SLAGLE, Consulting Surgeon, C.B. & Q. Railroad, Alliance, Nebraska.

Wednesday, September 10, 1941

DR. LUCIEN STARK, Norfolk, Nebraska, President, AMERICAN ASSOCIATION OF RAILWAY SURGEONS, presiding:

"Cardiovascular Disabilities of Railway Employees: Problems of the Consultant. A Review of Eight Years' Experience" — DR. HAROLD FEIL, Associate Clinical Professor of Medicine, Medical School, Western Reserve University, Cleveland, Ohio.

"Aseptic Necrosis of the Head of the Femur after Traumatic Dislocations of the Hip"—DR. S. W. BANKS, Chicago.

"The Treatment of Recent Intracapsular Fractures of the Neck of the Femur"—DR. JAMES W. DAVIS, Surgeon, Pennsylvania Railroad, Statesville, North Carolina.

"Management of Traumatic Intracranial Hemorrhage"—DR. E. S. GURDJIAN, Neuro-Surgeon, New York Central System, Detroit.

"Pyelonephritis"—DR. GORDON B. MYERS, Professor of Medicine, Wayne University School of Medicine, Detroit.

"The Hoke Traction Yoke in Fractures of the Humerus"—DR. JOHN W. THOMSON, Surgeon, Baltimore & Ohio Railroad, Garrett, Indiana.

"Infections of the Hand and Their Treatment"—DR. CHARLES F. WARD, Surgeon, Baltimore & Ohio Railroad, Cleveland, Ohio.

"Otoscopy in the Inflammations," and "A Clinic on Petrositis" — DR. SAMUEL J. KOPETZKY and DR. RALPH ALMOUR, New York, N. Y.

Monday, September 8, 1941

DR. JAMES F. DEPREE, Assistant to Chief Surgeon, Chicago, Milwaukee, St. Paul & Pacific Railroad, opened the Monday meeting with a "Discussion of Painful Backs Due to Myositis, Fascitis, and Neuritis."

A recapitulation of the causes of painful backs shows:

I. The Acute Painful Back, consisting of several groups:
   - A. Exacerbation of symptoms long present and otherwise grouped in the chronic type. The causative factors may be:
     - (1) Disease of the soft parts or bone.
     - (2) Postural disturbance, habits of occupation, anomaly or congenital malformation.
     - (3) Disease of extrinsic origin such as the viscera.
     - (4) Old injury, either of soft parts alone or associated with bone injury, the latter since healed.
   - B. Acute sprains and strains produced by indirect injury such as lifting.
   - C. Bruises and contusions produced by striking the soft parts.

Such cases may be treated by heat and the application of heat with expected recovery in 10 to 12 days.

II. Chronic Backaches:
   - A. Recurrent type with history of previous attacks denied.
   - B. Recurrent backache in which previous attacks are admitted.

Both groups may be classified as follows:

(1) Chronic fibrositis.
(2) Myositis and myofascitis.
(3) "Sciatic syndrome" of "Sciatica," with referred pain down the leg.

The Etiological Factors are:

A. Focal infection with chronic inflammatory changes or scar tissue in the muscle fibers and ligaments at origins and insertions of muscles or in fascial planes.

B. The combined factors of increasing age, hypertrophic bony changes and obesity.

C. Previous acute trauma with residual intramuscular or intrafascial hemorrhage and scar tissue formation.

We believe that the true sciatic neuritis should be an entity in itself. In its acute stage it produces a tender nerve, severe pain, loss of function and sensory disturbance and has the same etiology as any other neuritis, namely, focal infection, toxic or chemical poison, disturbed metabolism and vitamin deficiency. It tends to become chronic with formation of adhesions in the nerve sheath so that the normal mobility of the nerve is painfully restricted, not only of the main-trunk, but the divisions and branches into the muscle tissue as well.

The Treatment is outlined as follows:

A. Acute cases:
   (1) Rest and heat locally.
B. The chronic back:
   (1) Physiotherapy in which massage alone produces relief.

(2) Physiotherapy in which massage is supplemented by forcible stretching under a general anesthesia.

Initial treatment consists of gentle massage or effleurage to stimulate circulation and accustom the patient to the treatment, followed by firm massage or persiflage.

Where adhesions and infiltrations cannot be separated by firm massage alone forcible manipulation and stretchings under anesthesia are indicated.

In the essayist's experience this treatment has produced the most satisfactory results in those painful backs where myofascitis, fibrositis and neuritis are present, especially where the condition is chronic and of a recurring nature.

DR. STANLEY J. SEEGER, Consulting Surgeon, Chicago, Milwaukee, St. Paul and Pacific, of Milwaukee, Wisconsin, spoke on "The Treatment of Burns."

The classification of burns is difficult because of the difficulty of estimating the depth, and the ease of underestimating the seriousness, of a burn. One should be wary of prognosis, particularly in any burn which is likely to be severe. The table of Berkov is recommended for estimating the seriousness of a burn and as a basis for treatment.

The symptoms following a severe burn may be grouped into three principal divisions: The neurogenic, or primary shock; secondary burn shock; and shock involving toxemia and tremendous loss of fluid in the form of blood plasma. A fourth, suggested by McClure, of Detroit, is marked liver damage, which should be kept in mind because of the importance of glucose in helping the damaged liver.

As to the emergency treatment of burns, there are certain sound surgical principles which should be observed: Rest, application of sterile towels, warm blankets, and quick transport to the hospital. Possibly the best local treatment is the use of wet sodium bicarbonate dressings. As to hospital treatment, the method as developed at the Cook County Hospital, Chicago, by Drs. Koch and Mason, is recommended.

Care should be used in administering glucose, as too much may cause diuresis. Also, it is to be remembered that there is no given rule for the giving of plasma or fluid intravenously, because each patient is an individual factor. The speaker favored the use of tannic acid in large burns, but felt that it should not be employed on the fingers or hands, as this has often been followed by serious results. It is much more satisfactory to splint in position with pressure dressing, followed by emergence in normal saline, or, in some cases the careful use of picrate.

DR. R. RUSSELL BEST, Associate Professor of Surgery, University of Nebraska Medical School, Omaha, presented the subject "Continued Disability Following Cholecystectomy—Explanation and Management."

Under proper conditions of diagnosis, pre-operative management, operative technique and postoperative care, good results can be expected in 90% or more of gall-bladder operations in which cholelithiasis is part of the pathologic picture. If gall-stones are not found at operation, it has been my experience that good results cannot be expected in more than 70% of the cases. Cholecystectomy with or without opening the common duct should not carry an operative mortality of more than 3%.

Continued disability after cholecystectomy readily falls in one or more of three groups; namely, incorrect diagnosis, co-existing disease, or factors associated with an operation upon the biliary tract.

An incorrect diagnosis can usually be attributed to the lack of complete pre-operative gastro-intestinal study, misinterpretation of symptoms which have risen from disease associated with the heart or kidney or incomplete exploration at the operating table. There should be no rush for surgery in cases where the x-ray reveals only dysfunction of the gall-bladder and no associated true colic or pain or no history of jaundice, chills or fever. Thorough medical treatment must be tried. On the other hand, if there is x-ray evidence of normal gall-bladder function and the cardiac, renal and gastro-intestinal systems are negative, but the patient does complain of definite biliary colic, cholecystectomy should be advised. According to Carter, Green and Twiss, there is a 5 to 15% chance that stones are present in the gall-bladder even though they are not visible on the normal cholecystogram.

In the second group, when co-existing disease or pathology accounts for the continued disability, the disability period could be definitely shortened by a more complete study and examination of the patient before cholecystectomy. Any co-existing condition as peptic ulcer, cardio or pylorospasm, acid imbalance, spastic colon, hepatitis, pancreatitis or other gastro-intestinal disturbances must be corrected.

The third group deals with factors associated with the operation, and our most consistent sources of trouble seem to be the following: Permitting stones to remain in the common duct; dysfunction of the choledochal sphincter (spastic biliary dyssynergia); incomplete removal of the gall-bladder; postoperative hernia; biliary fistula; postoperative stricture of the common duct or disturbing adhesions.

Only rarely are adhesions in the gall-bladder region of significance. Operative injury to the common duct may result in complete obstruction or an incomplete stricture. With partial stricture, time, heat, restriction of activity and the three-day biliary flush may correct the condition. A biliary fistula in most instances is associated with obstruction of the common duct or sphincter area by stone, spasm, stricture or tumor. A cholangiogram should always be made in these cases before arriving at conclusions. The injection of 20 to 30 cc. of an organic iodide contrast medium is a simple procedure.

A postoperative hernia may be a serious disability and early repair of a small hernia is emphasized, because repair of a later, larger hernia carries an inevitably higher mortality, there is less chance of complete and permanent cure, and a longer period of disability follows. An overlapping procedure using non-absorbable suture material has given the best results.

Instances of re-formation of the gall-bladder have been reported, and the late H. L. Beye reported 14 (12.2%) in 66 secondary operations on the biliary tract.

Spasm of the choledochal sphincter (spastic biliary dyssynergia) has been proved a definite entity by both cholangiographic and intraductal pressure studies. This spasm may simulate simple biliary colic or common duct stone colic. Conservative management should first be tried after ruling out urinary colic or penetrating peptic ulcer. If the biliary flushes, anti-spasmodics, smooth diet and hot packs fail to bring about improvement, re-operation becomes necessary. The common duct is thoroughly explored and a T-tube is left in place for some three to 12 months.

Remaining common duct stone is the most common cause of disability following cholecystectomy. Mucous plugs, blood clots, collections of inspissated bile and debris may give rise to similar symptoms. The remaining stone may be one which was overlooked at the first operation, a hepatic duct stone reaching the common duct following operation, secondary formation of stone, or a stone dislodged from the gall-bladder into the common duct during operation.

The three-day biliary flush is always indicated in these cases unless there is complete jaundice. If the stone is not removed by the flush, a secondary operation becomes necessary and a T-tube is placed in the common duct. A cholangiogram must always be made before removing the tube.

The biliary flush regime is as follows:

1. Take three Decholin or Procholon tablets after each meal and at bedtime each day.
2. Take one teaspoonful of magnesium sulphate in water each morning.
3. Take two tablespoonfuls of pure cream or olive oil before noon and evening meals and at bedtime each day.
4. On the first day, place one nitroglycerin tablet (1/100 grain) under the tongue before each meal.
5. On the second day, dissolve one atropine tablet (1/100 grain) in a little water and take before each meal.
6. Repeat the nitroglycerin on the third day.
7. In cases with T-tube or catheter in the common duct, daily irrigations with warm saline and warm olive oil are of definite value.

DR. JAMES T. CASE, Consulting Roentgenologist, Chicago, Burlington & Quincy R.R., Chicago, limited his presentation on "Pitfalls in Interpretation of X-Ray Films of Bone Lesions" to a discussion of the variations within the normal x-ray aspects of the bones of the extremities which might lead to erroneous diagnoses of fracture or other pathology. Numerous lantern slides of roentgenograms and of explanatory drawings were exhibited. Particular attention was paid to post-traumatic calcification in the vicinity of the internal condyle of the femur (Pellegrini-Stieda's disease), and illustrations were shown of cases in which the calcification in connective tissues about the knee followed the trauma by from three weeks to three months, growing to its largest by the end of six to eight months, and disappearing or greatly diminishing within another six months. Such a lesion is often confused with fracture. This was one lesion of many shown to illustrate the need of avoiding these pitfalls.

DR. SANFORD R. GIFFORD, from the Department of Ophthalmology, Northwestern University Medical School, and Ophthalmologist, Chicago, Burlington & Quincy and Chicago & North Western Railways, spoke on "Referable Eye Cases," substituting on the program for DR. J. ROSCOE MILLER who was to have presented "The Heart in Industry."

The essayist presented an interesting review of some of the conditions in which early reference to the ophthalmologist is desirable, and stressed certain points in consideration of each. The first signs of corneal infection following a foreign body are exceedingly important and that they require the care of an ophthalmologist. When recurrent corneal erosion is discovered, even though overlooked for a considerable time, it should be treated radically, such treatment being effective and harmless. Any disturbance of vision following a contusion calls for ophthalmoscopic examination with dilated pupil, as it suggests commotic retinae, retinal detachment, or dislocation of the lens. While flash-burns are exceedingly painful, they are almost never serious; but effort should be made to control the pain and allay the apprehension of the patient as to the ultimate outcome.

DR. M. HERBERT BARKER, Associate Professor of Medicine, Northwestern University Medical School, gave "Chemo-Therapy: Surgery and the Sulfonamides."

Since sulfanilamide was first synthesized by Gelmo in 1908 and proved effective against hemolytic streptococci by Domagk in 1935, many new sulfa drugs have been developed. The following table illustrates their general use at the present time:

The general application of the sulfanilamides in surgical practice may be summarized as follows:

ORAL USE:

I. Use early and in full doses for lesions in which early surgery is more harmful than beneficial.
   A. Diffuse infections caused by hemolytic streptococcus:
      1. Cellulitis
      2. Lymphangitis — sulfanilamide
      3. Erysipelas
   B. Diffuse infections caused by staphylococcus:
      1. Early osteomyelitis
      2. Furunculosis
      3. Carbuncles — sulfathiazole
      4. Otitis—mastoiditis
      5. Staphylococcus bacteremia

      As localization occurs lesions must be drained.
   C. Infections of serous and synovial membranes:
      1. Peritonitis — sulfanilamide
      2. Pleuritis — sulfapyridine
      3. Supperative arthritis — sulfathiazole

II. The following infections are resistant to chemotherapy and demand surgery first:
   A. Localized abscesses of bone, soft tissue, pleura and peritoneum.
   B. Suppurative thrombophlebitis.

III. Questionable value:
   Gas gangrene infections—*oral* and *local* in conjunction with serum.

System—Infection	Organism	Drug of Choice
Skin and Subcutaneous Tissue:		
Erysipelas	Hem. Strep.	Sulfanilamide
Furunculosis	Staphylococcus	Sulfathiazole
Impetigo	Hem. Strep.	Sulfanilamide
Cellulitis	Staph. & Strep.	Sulfathiazole
Eye:		
Trachoma	Gonococcus	Sulfanilamide
Conjunctivitis	Pneumococcus	Sulfathiazole
Ear:		
Otitis media	Staph. & Strep.	Sulfanilamide
Mastoiditis		Sulfathiazole
Naso-Pharynx:		
Peridental infection	Streptococcus	Sulfanilamide
Sinusitis	"	
Pharyngitis		
Tonsil infection		
Upper Respiratory Infection:		
Tracheo bronchitis	Streptococcus	Sulfanilamide
Bronchitis	Pneumococcus	Sulfathiazole
	Mixed (H influenza)	Sulfadiazine (-diazine)
Pulmonary:		
Pneumonia	Pneumococcus	Sulfapyridine
Pneumanitis	Streptococcus	Sulfanilamide (-thiazole)
	Staphylococcus	Sulfathiazole
	Friedlander's bac	Sulfadiazine
Gastro-Intestinal:		
Dysentery	B. Flexner-Shiga	Sulfaguanadine
Surgery	B. coli	"
Ulcerative Colitis	Streptococcus	Sulfanilamide
Genito-Urinary:		
Urethritis, Prostatitis, Pelvic	Gonococcus	Sulfathiazole
Cystitis	Strep. fascalis	
Pyelitis	Pyocyamus	
	Aerogenes	Sulfanilamide
	Coli	
Lympho-granuloma	Filterable virus	
Meninges:		
Meningitis	Meningococcus	Sulfanilamide
	Staph.	Sulfadiazine
	Strep.	Sulfapyridine
	Pneumococcus	"
Bone and Joint:		
Arthritis	Gonococcus	Sulfathiazole
Osteomyelitis	Staph.	"
Systemic:		
Scarlet fever (Proph.)		
Septicemia	Streptococcus	Sulfanilamide
Bacteremia		
Subacute bacterial endocarditis		
Bubonic plague		
Local:		
Wounds	Strep.	Sulfanilamide
Burns	B Welchi	"
	Staph.	Sulfathiazole

LOCAL USE:

Principle—Local action of the sulfonamides is maximal when:

1. The number of bacteria is small.
2. The amount of devitalized tissue is slight.
3. The local and systemic concentration of the drug is high.

Wounds should be thoroughly cleansed, debrided and excised *before* the drug is instituted.

Prophylactic use—Favorable reports:

1. Clean surgical wounds.
2. Potentially infected wounds.
3. Dental, oral and naso-pharyngeal surgery.
4. Burns.
5. Pleural—peritoneal cavities if potentially infected.

The sulfonamides should not be applied to brain tissue because of potential irreversible damage.

Infected wounds—burns:

1. Streptococcus infections.
2. B Welchi infection in conjunction with serum.

Choice of drug:

1. Streptococcus infections—sulfanilamide.
2. Staphylococcus infections—sulfathiazole.
3. Pneumococcic infections—sulfadiazine.

Dosage:

0.1 Gm. per sq. inch of treated wound tissue.

5-15 Gm. usual total dose.

Method:

1. Insufflation or packing—American.
2. A thick paste worked over the wound area with finger until a uniform layer is obtained—British.

The recent development of the specific uses of the sul-

fonomides indicate clearly that one must study a case accurately from the bacteriological standpoint for their proper use. He must ever be watchful for their dangers.

DR. SUMNER L. KOCH, Associate Professor of Surgery, Northwestern University Medical School, Chicago, discussed "Tendon Suturing."

To secure healing of the wound by primary union is the first requisite for success. If infection develops after operation, whether repair is carried out immediately after injury or after the wound of injury is soundly healed, one must secure wound healing without inflammatory reaction if sutured tendons are to unite firmly and move freely after healing is complete.

The second consideration is as important as the first. Surgeons have not always remembered that not only must the tendon ends be firmly united, but also that the line of union must be so smooth, and the field of operation so nearly normal that the healed tendons can glide freely back and forth through a normal range of movement. It is in this respect that repair of tendons differs from nearly all other reparative procedures. We only ask for sound healing of the approximated tissues after intestinal anastomoses, after herniotomy, after closure of the abdominal wall. After tendon suture we must also have sound healing but with so little inflammatory reaction that fibrous adhesions do not form to hold the tendons in a vise-like grip and restrict or completely prevent free gliding movement. Such a result can be secured with patience, gentle handling of tissues, complete hemostasis, accurate approximation of tendons, fascia and covering skin.

After operation, sutured tendons must be kept at rest until healing can take place. The limb is supported in such a position that there is minimum tension on the affected muscles for a period of three or three and one-half weeks. Early movement does not prevent the formation of adhesions but can provoke the very irritation and inflammation that leads to their formation. If too vigorous, sutures cut through the soft ends of the approximated tendons or actually give way. In either event, separation follows.

DR. ALFRED J. BROWN, Surgeon, Chicago & North Western, Omaha, treated of "Fracture of Both Bones of the Leg."

The position of the bones of the leg and the surrounding muscles in the four-footed animal and in man, was compared, calling attention to the fact that weight bearing in man with inequality of muscles around the bones of the leg pre-disposed to displacement in fractures of both bones of the leg.

Attention was called to the two weight bearing lines of the lower extremity; namely, the anterior and lateral. These were cited as the criterion by which reduction of fracture of both bones of the leg could be determined. The method of determining the static lines by the use of tape with a loop in one end was mentioned, and the points through which the tape should pass were described.

Attention was also called to the use of the spiral molded plaster splint, reinforced by a posterior molded splint in maintenance of reduction of these fractures, and also to the use of a posterior molded plaster splint in place of a metal splint when skeletal traction is employed.

In conclusion, a fracture of both bones of the leg, treated as an emergency—reduced with reference to the static lines of the lower extremity—and immobilized by the method applicable to the individual fracture, will result in the majority of instances, in a useful lower extremity.

DR. R. M. GRAHAM, Chief Medical Examiner, Pullman Company, Chicago, presented "Some Results of Periodic Physical Examinations."

Following a short discussion of the value of the periodic physical examination in reducing sickness frequency in various groups of employees, the essayist reported on annual periodic examinations of about 9,000 men, by 60 examiners, from 1924 to 1940, and, for purpose of comparison, he contrasted briefly the findings of the 1924 and the 1940 surveys. He classified the employees at both dates into five groups as follows:

Class A—men of good physique without defects or diseases.

Class B—those with defects or diseases of slight importance, not handicapped for work, such as carious teeth, moderate pyorrhea, large tonsils, small varicoceles, moderately defective vision, etc.

Class C—those with defects or diseases constituting slight to moderate handicaps, or temporary handicaps amenable to correction, such as symptomless heart disease, large varicocele, hernia, bad pyorrhea, chronic nephritis, moderate hypertension, acute diseases, etc.

Class D—Those with defects or diseases constituting serious or permanent handicaps, but able to work, such as heart disease with symptoms, advanced nephritis and hypertension, diabetes, chronic infections, large and troublesome hernias, etc.

Class E—those with defects or diseases constituting serious and permanent handicaps, which make them unfit for work.

He concluded that "in spite of pre-employment examinations and periodic check-ups, there has been in 16 years a 10% increase in defects or chronic diseases." He went on to make comparisons, as to certain of these conditions, between the first year and the last of the 16-year period. There were improvements as to some; notably, dental conditions, genito-urinary, respiratory, and communicable diseases. Illustrative of the latter is that in the early examinations, 100 cases of active gonorrhea and 20 of active syphilis were found, while in 1940 only six cases of active gonorrhea and 11 cases of active infectious syphilis were discovered. The statistics and details of this paper will be given completely in INDUSTRIAL MEDICINE for December where the full text of the presentation will be published.

DR. ALFRED H. WHITTAKER, Detroit Area Surgeon, Railway Express Agency, Inc., talked on "Innomino-Abdominal Amputation—with Report of a Case."

The history of amputations was briefly reviewed, as was the history of amputations at the hip joint in military surgery, and then the essayist described the more radical amputation above the hip joint, which he called "Interinnomino-Abdominal." He gave the indications for this radical procedure, as outlined by DR. KELLOGG SPEED,[1] as follows:

1. Extensive disease of the proximal thigh where disarticulation of the hip will not suffice for complete eradication of the disease. This may be malignant or benign.

(a) Bone tumors involving the proximal end of the femur, the pelvic bones, or extending into the soft parts of the pelvic cavity.

(b) Chronic bone infections in the same locality not yielding to surgical drainage.

(c) Malignant tumors or infections of the soft parts of the hip area, extending into the bones or into the tissues of the buttocks.

2. Malignant bone tumors of the ilium and tumors of the soft parts of the pelvis too extensive to yield to local resection of that part, but which require resection of the entire limb.

3. Extensive dissecting aneurisms of the femoral artery.

4. Crushing injuries of the hip region with gas infection, or vascular occlusion.

5. Tuberculosis of the femur.

After this, the essayist explained the operative procedure in such a case, illustrating by moving pictures the technique which was used. This was the first picture ever made of such an operation, and its exhibition at this meeting was the first time it had ever been shown to a group of surgeons.

DR. FRANK E. SIMPSON, Chicago, talked on "Radium Treatment of Angiomas."

Owing to the contained blood, angiomas, popularly called "birthmarks," are always some shade of red or blue. When on the face or hands, they are peculiarly unsightly and distressing to the individual afflicted.

From the standpoint of treatment, Wickham and Degrais divided angiomas affecting the skin into five main clinical groups.

1. Read before the Western Surgical Association, December 4, 1931.

1. Flat, superficial angiomas. These fade momentarily on pressure.

2. Flat, deeply infiltrating angiomas level with the skin. These do not fade on pressure.

3. Raised, hard angiomas. These usually contain considerable connective tissue. They fade slightly or not at all on pressure.

4. Raised, soft angiomas. These tend to grow—sometimes rapidly. They fade on pressure.

5. Subcutaneous and submucous angiomatous tumors. These are soft and recede somewhat on pressure.

The different clinical groups merge into each other and several types may be present in the same individual or in the same tumor.

While a certain place is left for other methods of treatment, radium is the most valuable single agent in the modern treatment of angiomas. Study of its effects is essential, however, in order to obtain the best cosmetic results.

No age is too young for beginning radium treatment. The best results are usually obtained in young children.

Radium may be used in two ways: (1) Surface applications; (2) radium "puncture." "We mention the latter method only to condemn it. In our practice, radium 'puncture' is never used in cutaneous angiomas."

The technic of surface applications of radium has been described in previous papers. The secret of cosmetic success lies in the avoidance of inflammatory radium reactions.

To cause a fading and sometimes a leveling of the tumor, rather than to destroy it, is most desirable.

Among the advantages of radium treatment, (1) there is no pain. Children may take their daily nap while under treatment. (2) Treatment may be begun in earliest infancy. (3) In properly selected cases, the cosmetic results are superior to those obtainable by any other method.

Tuesday, September 9, 1941

DR. JAMES J. CALLAHAN, Consulting Surgeon, Illinois Central System, Chicago, spoke on "Carpal Injuries." The subject matter of this paper is to appear subsequently.

DR. JOSEPH E. SCHAEFER, Consulting Oral and Plastic Surgeon, Illinois Central, Chicago, described the "Repair of Facial Injuries."

Injuries of the face may involve the soft tissues; the bones without the soft tissue injury, or both of these structures may be injured simultaneously. In extensive lacerations of the face where the cuts extend through the orifices such as the mouth, the nares, or the palpebral fissures, it is important that the margins of these orifices are first sutured.

If the lips are torn through and through, the vermilion borders are first sutured. The placing of the primary sutures determines the position of those placed subsequently.

If the bones of the face are fractured it is of the greatest importance, if bad deformities are to be prevented, that these fractures are properly reduced and fixed.

Depressed fractures of the malar bones, the nasal bridge, and the zygomatic arch must all be elevated to their normal positions.

In extensive fractures involving the maxillae, nasal bones and malar bones, elevation and fixation can be accomplished through a basic appliance applied to the head. Such an appliance was illustrated by lantern slides.

When losses of tissue occur they can be restored by means of free transplants of skin, cartilage and the pedicle flaps.

Various types of these injuries with their corrections were shown by means of lantern slides.

DR. CARL A. JOHNSON, Associate in Medicine, Northwestern University Medical School, Chicago, presented "Arteriosclerotic Vascular Disease."

DR. JOHNSON'S paper, with the most important of the illustrations, is published in full in these pages, beginning on page 453.

DR. N. C. GILBERT, Consulting Internist, Chicago, Rock Island & Pacific, presenting the subject "Hiatus Hernia," said that esophageal hiatus hernia is not an uncommon occurrence. It is being diagnosed with increasing frequency, but a great many cases are still being overlooked and are still being classified as various upper abdominal and cardiac disorders. A careful history will frequently make a differential diagnosis. Hiatus hernia should be suspected in all cases exhibiting upper abdominal symptoms and also in cases of shortness of breath, palpitation, paroxysmal fibrillation, and anginal pain, where no other definite cause can be found.

Hiatus hernia is usually readily remediable. Diagnosis and care will permit many patients to return to work who have been considered incapacitated. Little or nothing has been said in regard to hiatus hernia as a cause of industrial incapacity. That it can be a cause of such incapacity is illustrated by the case histories which are given. Various other points in the pathogenesis and diagnosis are discussed in addition to some histories illustrative of different types of cases.

DR. HARRY E. MOCK, Consulting Surgeon, Chicago Rock Island & Pacific, Chicago, treated of the "Management of Skull Fractures — Report of Nation-Wide Survey."

The intracranial pathology and not the fracture in the skull guides the management. Comparing 100 cases of head injury with skull fractures with 100 cases without fractures, the mortality rate in the former is approximately 10% greater. Therefore in collecting these statistics proved skull fractures were used to secure cases of comparable severity.

In the symposium on skull fractures held before this Association in 1933 many controversial suggestions concerning management were presented. "Today," said DR. MOCK, "I bring you facts and figures that should prove conclusively the best lines of management that are followed by those who secure the best results."

Over 6000 consecutive cases of proved skull fractures have been collected by the author in the last 12 years in addition to 400 cases treated personally. His first survey, made over a five-year period, 1930 to 1935, and covering 3300 case records studied, showed:

Mortality rate in proved skull fractures varied from 25% to 49%, average 32%.

His second survey, covering 3106 consecutive proved skull fracture records for a five-year period, 1935 to 1940, showed:

Mortality rate in proved skull fractures varied from 17% to 42%, average 28%.

Comparing the types of management in the four hospitals (373 consecutive cases) where good observation and good treatment was used with the 11 hospitals (750 consecutive cases) where poor observation and treatment was the rule, one finds the answer to the question, "How Can the High Mortality Rate in Skull Fractures Be Reduced?"

From the various tables shown by lantern slides it was evident that the following types of treatment gave the best results:

1. Close observation of the patient—pulse, respiration, temperature, and blood pressure and recording of same at least every two hours. All treatment must be guided by changing signs and symptoms of the patient.

2. Adequate dehydration—50 cc. of 50% glucose intravenously and repeated as indicated by signs and symptoms. Fluids not too greatly limited but never pushed—usually an average of 2000 cc. daily will preserve fluid balance.

3. Over-dehydration and starvation must be avoided.

4. Spinal puncture when indicated is really a life saving measure. It was used in 50% of the cases in the good treatment group as against 18% of the cases in the poor treatment group. To be really effective spinal drainage must be done daily usually in the first 24 hours and an adequate amount of fluid drained, usually 20 cc. to 60 cc. With recurrence of signs and symptoms spinal punctures must be repeated, usually every six to 24 hours.

5. Operations are indicated in definitely depressed or compound depressed skull fractures, in extradural and subdural hemorrhages. Exploratory decompressions are

indicated when the latter two conditions are strongly suspected. Subtemporal decompressions, per se, are seldom indicated. Few skull fractures require early operations and never in the presence of cerebral shock. Too low or too high an operative rate increases the mortality rate. Eight to 10% of all skull fractures will require operations.

The mortality rate in the good management hospitals varied from 17% to 21% as compared with a mortality rate of 29% to 42% in the hospitals having poor management.

The author's mortality rate in 400 cases of consecutive proved skull fractures is 16.8%.

DR. W. J. WALKER, Assistant Surgeon, Atchison, Topeka and Sante Fe, Topeka, Kansas, had the subject "Peptic Ulcer."

The morbidity of this disease is high, the economic loss is immense, the treatment is lackadaisical, and recurrences are almost the rule.

Etiologically peptic ulcer can be viewed from two angles: (1) that it is a local disease, and (2) that it is a manifestation of a constitutional disease of which the local phenomena, namely hyperacidity and ulcer, are secondary. Considerable experimental evidence supports this second thesis, and, to the essayist, clinical experience is convincing that peptic ulcer is generally psychogenic in origin.

It is a disease of stresses and maladjustments and tension; difficulties at home and on the job. Many of its victims are of congenitally poor protoplasm; if they did not have ulcer they would have some other disease common in the below-par multitude.

At the same time it is prevalent in the hard-driving and efficient type.

Symptomatically it is a dyspepsia characterized by gas, belching, sour stomach and abdominal distress, relieved by food and alkalies. Generally the diagnosis awaits the discovery by x-ray of a lesion in the duodenum or the stomach. But the speaker's opinion was that the presence of an ulcer is not necessary. The symptoms may be present and the ulcer may or may not be discovered or it may be absent. The mental quirk must be uncovered and the ultimate psychological cause of the disease must be treated. Medically, sedation is necessary. Nothing is better than bromides and belladonna and hyoscine. Alkalies are contra-indicated. Diet must be ample and varied. Malnutrition and avitaminosis must be guarded against. This line of treatment will take care of 80% to 90% of the cases. In the remaining 10% to 20% of the cases are the intractable patients and those with complications a few of which merit surgery. Ulcer in the sub-standard individual is generally intractable; as the numerous operative scars on their abdomens testify.

Gastric ulcers which do not heal in three or five months are entitled to resection on account of the malignant tendencies of these cases. In duodenal ulcers obstruction and gross malformation rate surgery. The essayist did not discuss surgical procedure except to say that he did not think that gastro-enterostomy is the discredited operation that the literature coming out of some of the clinics would indicate.

In conclusion, duodenal ulcer is a psychogenic disease in which psychotherapy is the proper treatment. And the modern general practitioner is psychiatrist enough to treat most of the cases.

DR. E. H. DECKER, Dermatologist, Atchison, Topeka & Santa Fe, Topeka, Kansas, talked on "Skin Diseases Common to Railway Employees." Disposing of the idea that there are some skin diseases more common to railroad employees than are seen in the general run of skin cases, the essayist dwelt upon various common disorders such as fungous infections of the feet, pre-malignant and malignant conditions about the face, dermatitis venenata, bacterial dermatoses, ulcers following impetiginous infection, sycosis of the beard and pruritus ani. The full text of this paper appeared in INDUSTRIAL MEDICINE for October, 1941, beginning on page 421.

DR. JAMES E. M. THOMSON, local surgeon, Chicago, Rock Island and Pacific, Lincoln, Nebraska, in discussing "Fractures of the Patella," said that there are three schools of thought in regard to treatment of fractures of the patella:

1. A restorative treatment in which fractured fragments are reassembled and bound or sutured with various substances.
2. Excision treatment has gained popularity recently.
3. Because of the drawbacks connected with the two preceding methods, the third, removal of loose fragments and plastic repair of the tendon leaving one attached fragment intact, offers advantages in that it removes the element of treating a fracture and reduces the procedure to one of tendon repair. Second, it restores the normal integrity and appearance of the knee. Third, it shortens the period of disability and decreases the amount of disability.

To evaluate the appropriateness of this procedure a study of 554 cases on which this operation was performed was analyzed. The operations were performed by 115 surgeons. It is the essayist's belief that this method offers more than any other method of treating fractures of the patella.

DR. SPENCER WRIGHT, Surgeon, Union Pacific, Salt Lake City, Utah, described "Newer Methods for the Repair of Inguinal Hernia." Mentioning recently acknowledged methods of procedure, anatomic variations of repair, the suture materials used, and end results as to recurrence and infection rate, the essayist went on to describe various kinds of sutures: Fascia, silk, silk and chromic, and, finally, chrome alloy stainless steel wire—the latter in detail, concluding with a report of 17 cases in which it was used. He outlined the surgical procedure and reviewed the cases statistically, concluding as follows: "With the use of chrome alloy steel wire non-absorbable material, hospitalization and lapsed time of days lost from work have been effectively reduced. Owing to the use of non-absorbable suture which is resistant to tissue reaction, no hesitancy is necessary about permitting early return to work. The patient experiences no ill-effects from the presence of the wire." This paper was published in full text in INDUSTRIAL MEDICINE for October, 1941, pages 418-421.

DR. R. M. SHEA, Surgeon, Union Pacific Railroad, Denver, analyzed very interestingly the "Opportunities of the Company Doctor."

The opportunities for the medical man in the field of industrial medicine and surgery may be summarized under five headings: (1) Prestige of being connected with a large industrial concern and the association with other men in the field. (2) The advantages presented for study of the many problems confronting the industrial physician and surgeon which are not ordinarily seen in general practice. (3) The excellent equipment and facilities offered him in the way of supplies, medicine, nursing care, etc. (4) Contacts, both with officials and with the men. (5) Compensation, which although not princely in a financial way, is steady and sure and will continue as long as his services are desired.

The opportunities for the medical man in industrial medicine today, particularly the young man, are greater than at any previous time; and the shortage of talent of the kind needed in industrial work is becoming more and more acute.

DR. CHARLES E. SLAGLE, Consulting Surgeon, Chicago, Burlington & Quincy R. R., Alliance, Nebraska, had for his subject the question, "Can The Relations Between the Employee and the Examining Surgeon be Improved?"

This referred to the very evident dissension that existed years ago between the employees and the management. The application of the Golden Rule produced wonderful results, and for many years relations were much improved. Organized unions and politics came into the picture, however, and demands for many things came along until the Golden Rule was forced to give way to the "Rule of Reprisal" between the management and the employees.

The paper closed with (1) a personal approach to the difficulty by recalling the advantageous position the employees have gained through political influences, and by reminding that the examining surgeon must become reconciled to his now established position with its disadvantages and try to win the employee away from any deeply-rooted idea about the "Big Bad Wolf," and (2) a number of definite suggestions as remedies for situation.

Wednesday, September 10, 1941

DR. HAROLD FEIL, Associate Clinical Professor of Medicine, Western Reserve University, Cleveland, Ohio, presented "Cardiovascular Disabilities of Railway Employees—Problems of the Consultant. A Review of Eight Years' Experience."

One hundred fifty-two cases, all railway employees, formed the basis of this study. The men were judged from the viewpoint of (1) their fitness to carry on their jobs, (2) the risk of individuals whose lives may be endangered by sudden disability or death of the employee, and (3) the liability of the corporation or insurance company for responsibility in case of disability or death.

Heart disease is the leading cause of death today, and, as in the general population, heart disease plays a leading role in railroad disability and death. These employees averaged 53.2 years of age. An analysis of the diagnoses revealed the following types: Hypertension 38.8%; coronary artery disease 26.1%; neurotic heart disease 7.7%; syphilitic heart disease 2.8%; cor pulmonale 2.8%; hypertensive carotid sinus 4.2%; extreme obesity 2.8%; and hyperthyroidism 1.4%. The Kline test was positive in 8.3%. The influence of alcohol, tobacco and coffee was the same in all groups and apparently did not play a part in the etiology of coronary artery disease or of hypertensive disease.

In evaluating the hypertensive cases—if the pressure was not beyond 200, if the heart was not greatly enlarged, if the tolerance of exercise was not greatly reduced, or if there were no symptoms of angina, the men were allowed to carry on their work. Frequent observations are of course advised. In angina pectoris (due to coronary artery sclerosis) the advice was disqualification if the pain was induced by slight effort. Of course engineers should be relieved of their regular runs.

After myocardial infarction, if the exercise test is well tolerated and if there is no objective sign of cardiac failure, the men are allowed to return to their work, after prolonged convalescence. This advice implies that these men will not return to hard physical labor or to jobs where the men work alone. In the case of engineers, men are relieved of passenger and freight runs. Their work is limited to the yard engine. In the case of other types of heart disease, these same rules apply.

This plan, with a humane feeling for the employees, and a sense of responsibility to the railroad and its passengers has resulted in a fortunate handling of men who are borderline disabled. Intelligent cooperation between men and medical personnel will result in fairness to all concerned.

DR. S. W. BANKS, Chicago, had the subject "Aseptic Necrosis of the Head of the Femur after Traumatic Dislocation of the Hip." The material of this paper is to be published later.

DR. JAMES W. DAVIS, Surgeon, Pennsylvania Railroad, Statesville, North Carolina, discussed "The Treatment of Recent Intracapsular Fractures of the Neck of the Femur." These constitute the majority of fractures about the hip joint. The essential problem in the treatment of these is the reduction of the fragments and retention in proper position until union takes place. The essayist prefers the Smith-Petersen nail for retention of the fragments in position. The insertion or application of this nail depends primarily upon placing a guide pin through the external surface of the trochanter through the center of the neck of femur into the head of the femur which acts as a guide for the cannulated Smith-Petersen nail. When this guide wire is once in place, threading the needle and driving the nail into position is a very simple matter.

The use of the Engel and May localizer for obtaining the horizontal and vertical planes is most helpful, and, after the horizontal and transverse planes are located, which is usually very easy, the vertical plane is located by putting the localizer in the vertical position and then inserting a guide wire through the outer surface of the trochanter through the neck into the head of the femur, using judgment as to the proper direction. The leg is then flexed and abducted and x-rayed in this position, which enables the operator properly to localize the vertical plane, and if the pin is not in the correct position, a second one can be placed with great accuracy. A Smith-Petersen nail of the correct length, which has been accurately determined, is threaded on this guide pin and driven into place. This method has given a very high percentage of good results.

DR. E. S. GURDJIAN, Neuro-Surgeon, New York Central System, Detroit, presented the subject, "Management of Traumatic Intracranial Hemorrhage."

Traumatic intracranial hemorrhage with particular reference to the surgical management was discussed on the basis of 31 cases of epidural hemorrhage, 28 cases of acute subdural hemorrhage, 37 cases of chronic subdural hematoma, and 24 cases of subdural accumulation of spinal fluid. The diagnosis and surgical management of these various conditions were illustrated. The association of several types of lesions in the same case was emphasized. Indications for exploration in cases of acute head injury are: (1) Increasing drowsiness or increasing coma in an already unconscious case; (2) localizing neurological findings not previously present, particularly, if they show progression; (3) in some cases, lowering of the pulse rate; and (4) high spinal fluid pressure (in some cases). It may be impossible to diagnose the exact pathology pre-operatively, although this should be strived for. In selected cases, air studies may be worthwhile for localization.

DR. GORDON B. MYERS, Professor of Medicine, Wayne University, Detroit, presented the subject "Pyelonephritis."

While the diagnosis of pyelonephritis, pyogenic infections of the kidney, is relatively simple, certain symptoms may sometimes be presented which cause it to be confused with another condition, such as penumonia and acute appendicitis. The essayist described the acute case, pyelitis, as compared to the chronic picture, and outlined five cases demonstrating the outcome when an acute infection goes into a chronic terminal pyelonephritis. While there isn't much to be done when a case has reached the terminal state, a lot can be done to eradicate the foci of infection in order to prevent it from reaching a chronic or terminal stage.

In the management of pyelonephritis, chemotherapy is felt to be the initial measure in the eradication of the foci of infection and as a means of sterilizing the urine. An estimate of renal function, and sometimes a urine culture, are essential as a means of determining the type of chemotherapy best suited to the individual needs. The presentation was replete with case reports illustrating various methods of chemotherapy.

DR. JOHN W. THOMSON, Surgeon, Baltimore & Ohio, Garrett, Indiana, discussed "The Hoke Traction Yoke in Fractures of the Humerus."

A great many fractures of the humerus need traction to obtain apposition of the fragments. The various types of commercial splints are on the whole uncomfortable and require almost daily inspection and adjustment. Traction in recumbency is cumbersome and has further disadvantage of confinement of the patient to bed for four or five weeks.

Dr. Lawson Thornton, of Atlanta, Georgia, published in *The Journal of Bone and Joint Surgery*, October, 1930, the plaster traction method of Dr. Michael Hoke. This consists essentially of a plaster of Paris arm spica with a yoke extending beyond the elbow through which trac-

tion is made on the fracture and counter traction against the body by means of a windlass or threaded stem hook. Either adhesive traction or skeletal traction by means of a pin through the olecranon may be used.

With certain modifications the essayist had used this method in a large number of cases with excellent results, especially in fractures about the neck of the humerus and oblique fractures of the shaft.

Slides showing photographs of the apparatus and roentgenograms of different types of fracture were given.

DR. CHARLES F. WARD, Surgeon, Baltimore & Ohio, Cleveland, in presenting "Infections of the Hand and Their Surgical Treatment," said that the discussion of infections of the hand must proceed from an anatomical viewpoint. Infections involving the dorsum of the hand are not as serious as palmer infections, and would not be discussed.

Anatomical structures to be considered are: 1) Lymphatics. (2) Tendon sheaths. (3) Facial spaces.

The lymphatics consist of a deep and superficial group. The superficial lymphatics are the most important in hand infections. Infection of this structure may quickly become a blood stream infection. The little and ring fingers drain into the epitrochlear glands. The thumb and index fingers drain into the axillary glands. The middle fingers drain into the subclavian glands. Lymphatics when inflamed are never incised but treated conservatively with rest and chemotherapy.

Tendon sheath involvements of the index, middle and ring fingers are similar, the tendon sheath extending from the distal phalanx to one-fourth inch proximal to the web of the hand. The little finger tendon sheath may or may not connect with the ulnar-bursa extending into the major forearm space beneath transverse carpal ligament. The tendon sheath of the thumb communicates with the radial bursa which also extends into the major forearm space.

The three major spaces are the middle palmer, thenor space and the major forearm space. Infection in the middle palmer space may extend to the dorsum of the hand if it distends and ruptures, extending along the lumbrical muscles of the middle and ring fingers. The same is true of the thenor space if it ruptures along the lumbricals of the index fingers. The major forearm space becomes involved by extension of the infection from the radial and ulnar bursa.

The tendon sheaths, bursa and facial spaces and other minor infections must all be surgically drained early and in a bloodless operative field. Properly placed incisions as learned from anatomical dissections together with appropriate after care will lessen the morbidity and mortality rate.

DR. SAMUEL J. KOPETZKY and DR. RALPH ALMOUR, New York, had the subjects "Otoscopy in the Inflammations," and "A Clinic on Petrositis." These were presented by sound and color films.

Vitamins and Minerals

—Observations on the Nutrition Problem—

WALTER H. EDDY,

Professor Emeritus of Physiological Chemistry, Teacher's College, Columbia University; Formerly Director of Food and Nutrition Division, Surgeon-General's Office, A. E. F.

IT has been asserted, by government officials, that three out of four people are not getting the proper nutrition to support the added demands upon their strength, endurance, stamina, health and vitality now required in the tremendous national defense program—"that 95 million Americans either cannot get the right food or have such bad habits that they don't eat enough of the right food." Whether that is an overestimate or not, it is undoubtedly true that malnutrition is a primary menace to at least the portion of that vast majority of the population who are engaged in industry.

So far as individuals are concerned, the national defense program has two parts: The one represented by the soldier; the other by the civilians who support his activities. The ratio as between the two is 17 to one—17 industrial workers are needed behind the lines for each soldier who is in the lines. With a million and a half in the present army, this means that 25 million more are involved in keeping him at top efficiency—to say nothing of the other millions whose work is absorbed by the needs of the National allies.

The problem of the soldier's efficiency is well handled. He is intensively trained, mentally and physically, by the most advanced methods, to keep him alert, strong, energetic and efficient for his task. He gets the benefit of fresh air, sunshine and routine exercise. His diet includes ample supplies of vitamins and minerals. He receives periodic rest periods and medical examinations. Nothing is overlooked to make him superior, and keep him so.

But it is equally important to keep the industrial worker in top mental and physical condition. This, however, cannot be done for him in the manner in which it is done for the soldier. With every condition of his work place agreeable, all occupational hazards under control, all occupational diseases headed off at source, every consideration given to safety, convenience and even comfort, the industrial worker is still a free agent as to what he does with his time outside of the plant, his methods of recreation, the amount and quality of his rest, and, above all, his eating habits. Carelessness in these respects is inevitably reflected in his work. And carelessness in these respects opens the door to the sicknesses which cause absenteeism from work, as to which it is estimated that the total cost is the equivalent of 400 million days of labor annually.

A good many of the disabilities which cause lost labor production have a basis in malnutrition. Among these are: Common colds, nervousness, anemia, loss of vigor and appetite, physical weakness, digestive and gastro-intestinal disturbances, constipation, colitis, tuberculosis, premature aging, poor eyesight, stooped posture and a general lack of resistance to disease with exposure to infection. A further consideration is that over 51% of the employees in industry as a whole are 40 years of age or over, and many of them suffer from degenerative ills, often heretofore attributed to old age.

THE problem of restoring and maintaining individual efficiency in so far as it is approachable through diet is by no means easy of solution. The fact and the scope of the problem are well illustrated by what has happened in Europe, the Nazi strategy showing the effect of deprivation of vital food elements, and the British counter-strategy demonstrating the effect of properly bal-

anced food intake. As his giant war machines conquered nation after nation, one of the first things Hitler did was to deprive the defeated peoples of foods rich in vitamins and minerals, intending, by robbing them of the elements essential to nourishment, to reduce their vitality, courage, stamina, strength and ability to resist. These expropriated foods, of course, were transferred to Germany.

The British government, meanwhile, took over control of the food of its people, and employed scientists to teach the great importance of the right kind of balanced diets. Many foods were immediately fortified by vitamins and minerals, the articles to be so supplemented being chosen as those most easily available and most generously used. The result of this is strikingly apparent. In less than a year, England as a nation has become healthier than before the war. The death rate is lower, and infectious diseases and chronic nervous illnesses have greatly decreased.

As to the possibilities of proper nutrition, the words of Col. Albert P. Clark, head of the Fort Lewis Base Hospital, Fort Lewis, Washington, have had wide publicity. Col. Clark said: "If I had the opportunity to select 5,000 men and feed them a specially prepared diet with increased mineral and vitamin content, I would have a small army of unbeatable men within six months."

IN THIS country, however, the problem of the individual worker's diet is beset with numerous conditions which are difficult to control. There is, of course, the selected menu, properly adjusted in calories, proteins, vitamins and minerals, put out by organizations and agencies interested in nutrition. Such educational information on matters of diet is easily found. There exists, however, no means under the American way of life, of compelling the individual interest which would insure the personal use of such information by all who should use it. The worker still is able to let what he wants be his first rule of selection, subject to the other influences of price, availability, convenience, and personal habits and idiosyncrasies.

These considerations seem formidable in the first approach to the problem of adequate nutrition. But they are much less so when they are attacked from the standpoint of supplementary feeding. There has been a good deal of attention given lately to the matter of supplementary feeding, on the basis that too little of the necessary vitamins and minerals which the diet ought to provide is distinctly harmful, while too much does no harm at all.

A recent article by Haggard and Greenberg,[1] from the Laboratory of Applied Physiology, Yale University, defines the ideal form for a supplementary food as to both practical and nutritional features. As to the first, it "requires no preparation; can be easily and quickly consumed—preferably liquid; can be preserved until time of use without spoilage; offers no danger of contamination; does not have an organic residue which may litter the working quarters; does not come in contact with worker's hands—no contamination of food or soiling of hands of employees doing delicate work; and appeals to a wide range of tastes, even with repeated use." As to the second, the nutritional features, it is necessary that the food contain vitamins and minerals, and be readily digestible so as rarely to cause gastric disturbance or allergic reaction.

They continue: "The one valid objection to between-meal feeding—that the food selected may not contribute adequately to the diet as a whole—can be readily overcome by selecting foods that supply vitamins and minerals in addition to carbohydrates. The supplementary feeding may then make an actual contribution to the diet in that it tends to correct deficiencies that may already exist."

SOME medical authorities have taken issue with Surgeon-General Parran and Paul V. McNutt who, on behalf of the government, have been calling attention to the under-nourishment of such a large proportion of the population, and there is a controversy under way in the medical journals, particularly regarding the scope of the many claims that are made for vitamins. The high points of the controversy seem to be its opposite poles—the claim that too many are suffering from possible vitamin deficiency on the one side, as against clinical statistics to the effect that the number of actual cases of vitamin deficiency is astonishingly small. To draw a general conclusion from either would probably be ahead of the truth as to the first, and behind it as to the second. Between the two, the inescapable fact remains that the average diet of the average person would undoubtedly be improved by fortification with minerals and vitamins—with the effect that for those who need these elements in added quantity they would be available, and for those who don't need them they will do no harm. The increasing use of vitamins and minerals is, therefore, a prophylactic measure against malnutrition, and it ought to be encouraged instead of discouraged. If the added daily dose can be put up in a form that will commend itself to the uses of supplementary feeding, particularly in industrial situations, so much the better. Dr. Russell M. Wilder, Professor of Medicine, Mayo Clinic, recently said:[2] "The efficiency of our man power must be as good as the machines at their disposal. The war of today can be resisted only if impoverished diets are eliminated, and the moral and mental fiber will be such that fear (an early symptom of nutritional deficiency) will be largely eliminated. It is important at this time to secure the full cooperation of the many public and private groups which are able to contribute to the improvement of the nation's nutritional status. Not only speed but also stamina and determination are pressing needs in the current emergency, and self-confidence, courage, and will to do are directly affected by 'what men have for food'."

References:

1. In *J. Am. Dietetic Assoc.*, October, 1941.
2. In *War Medicine*, Vol. 1, No. 1.

Who's Who in Industrial Medicine and Surgery

—*Idealist*—

CONFORMING to the long established industrial relations policies of International Harvester Company which provide for retirement after 30 years of employment and age 65 attained, DR. JAMES A. BRITTON, on November 1, 1941, gives over the place he has held since 1911 as Supervisor of Medical Service, and withdraws from the scenes of his long time activities and the field of practice which has known him so well and so favorably.

After a period of rest and travel, he will be available in a consulting capacity.

JAMES ANDREW BRITTON

It is not to speak of him in the past tense that this is written, but rather—at this time of his transition from the front line to the reserves—to summarize and record, in the briefs of words, his contribution to the structure of industrial medicine today. He is one of the pioneers—that goodly company who, without "any school or hospital training especially designed to fit them for their work," went into jobs that weren't jobs at all, but opportunities, formless until they formed them, and lacking definition until, with creative skill and patience, they defined them. He is one of those who, in his own phrase, "really served an apprenticeship." One of those to whom it is owed that there are rules and guides and precedents and ideals which can be taught, so that preparation for the practice of industrial medicine can begin with the study of accumulated experience, in a manner comparable to preparation for the other medical specialties.

It may be surprising to DR. BRITTON to have his career appraised, in the permanency of print, as an expression of idealism. But all of the pioneers were idealists, exceedingly practical withal, yet each one striving toward the evolution of the science of industrial medicine and contributing his part to its building. Now that the edifice has emerged—in shape and line and feature, tall and imposing—the function of each and the importance of what he did is cognizable in relation to the whole. Each fashioned his stone and hewed his timber, brought forth the substance of his brain, the earnest of his heart. And the integrity of the sum of all is the proof of the soundness of each.

DR. BRITTON'S contribution, however, was even more. As he worked he dreamed. The Medical Department he inaugurated at International Harvester has grown under his hand and direction until it is one of the greatest. In all respects of the many elements that comprise a first-line medical department, it is too well known to need description here. Such departments are the lengthened and applied personalities of the men who made them; and to make one of them is usually enough of an achievement to fill a career and absorb a personality. But this man's gifts and qualities went farther; the shadow of his vision lies athwart the whole field. Practical as he was, adept in every art of careful construction, skilled in all the details of superior workmanship, he was more than builder; he was one of the architects of industrial medicine. It is due to him as much as to any other single individual that the great fabric of industrial medicine in its entirety is not only a temple of science, but also a cathedral of humanism.

TO those who were closely associated with DR. BRITTON, his humanitarian characteristics were ever outstanding. Predominant in the personal equation that was himself, they were inspired and directed by certain of his early experiences. He was born in Dallas County, Iowa, October 28, 1876. Following high school at Sidney, Nebraska, he attended the University of Nebraska, graduating B.S. in 1899. Thereafter he went to Chicago, where the fates that manage those major meetings which are part of a man's destiny led him to Hull House. He became a resident there in 1902. This was the right atmosphere for his temperament. Under the influence

of the statesmanlike humanitarianism of Jane Addams, and in contact with the serious and earnest group who were aiding her, his own ideas as to how he could be most useful and effective in practicing the gospel of betterment assumed direction and took form. He was working then at Western Electric, in charge of a group of several hundred employees. An interest in those features of their situation which were extra-contractual—those matters over and above the mere equivalency of work and wage which are now so important in industrial relations—was a natural expression of his qualities of heart. He observed his work people affected by fatigue, sickness, lay-offs, and others of the handicaps of employment which the years have somewhat alleviated. Thinking about the effects of those things which he saw, and trying to relate them to their causes which he didn't see, he made up his mind that he wanted to have a definite part in the reorganization and reconstruction of that portion of the employer-employee relation which includes them. He believed that their unequivocal recognition must necessarily become the super-structure of the wage relation in general. He foresaw such incidents of employment as the elimination and control of work hazards, the placement of employees in jobs they could do, the legitimacy of employer interest in undernourishment and fatigue, the importance of health, the sound economic philosophy of vacations with pay. The practical approach to the solution of the problems these things involved was by way of medicine, so he enrolled at Rush Medical, where he worked his way, emerging as M.D. in 1907. His first job for International Harvester was to make a survey among employees as to the prevalence of tuberculous conditions. This led to the opportunity to broaden the scope of the company's medical relations with its employees, which, theretofore, had been practically all surgical, and to establish a Medical Department. This he did in 1911. His department has had considerable to do with the general employee policies of the company. It is a tribute to the effectiveness of his insistence in this connection that the rules of retirement to which he is now yielding were established largely through his own efforts.

To mention a few among the many other things which are also a tribute to his insistence, there is the fact that Harvester's present standard for an injured worker is "whatever is necessary, promptly and efficiently rendered, and as long as necessary." If he requires a private room and three nurses to live up to this standard, he gets them. And the facts that, whereas 30 years ago 5% to 10% of applicants were rejected for employment on the basis of their medical examination, today if there are more than 1½% rejections it is the system and not the employee that is suspected; and that in the last four years there has not been a single heat prostration death at Harvester.

With all the pioneering there was to be done in establishing his Medical Department, the innumerable problems, and the elements of medical application that came to be needed in the great Harvester enterprises, he nevertheless found time for a special interest—the study of the lungs as the site of absorption of pulmonary irritants, dusts, gases, vapors and bacteria. One result of this special interest is that while the tuberculosis rate in Chicago industries 40 years ago was as great as that for the city in general, in the Chicago plants of International Harvester today the tuberculosis rate among employees is down to one-fourth of that of the community, even though the community rate has itself been cut to one-fourth of its previous level. Upon the knowledge of these things, and in the literature concerning them, he has left the strong and permanent imprint of his habitually careful analysis. A few of his writings are: "Silicosis, a Modern Factory Hazard," (*J. Indust. Hyg.*, 1924); "Danger of Delayed Development of Pneumoconiosis," (with J. R. Head, *Monthly Labor Review*, 1931); "Pneumoconiosis: Delayed Development of Symptoms," (with J. R. Head, *J.A.M.A.*, 1931); and more recently, the text of "An Industrial Department of Health," (Bulletin No. 9, Department of Industrial Medicine, Northwestern University Medical School, June, 1939); and "Health Hazards of Electric and Gas Welding," (with Eugene L. Walsh, *J. Indust. Hyg.*, April, 1940).

From 1920 to 1927 he was Medical Director of the Edward Sanatorium at Naperville, Illinois, and from 1923 to 1927, a member of the Medical Board of Chicago's Municipal Tuberculosis Sanitarium. His hospital connections include staff positions at Passavant Memorial and St. Luke's, Chicago. He has been for some time Associate Professor of Medicine at Northwestern University Medical School, and will retain that position. His medical memberships embrace A.M.A., A.A.I.P. & S., Illinois and Chicago Medical Societies, American Public Health Association, Institute of Medicine of Chicago, National Tuberculosis Society, Chicago Tuberculosis Society, Society of Internal Medicine, and Society of Medical History of Chicago. In World War I he was Major, U. S. Medical Corps, May, 1917, to January, 1919.

IT was at Hull House that he met Gertrude Frances Howe, herself imbued with the humanitarian heart that since has carried her to distinction as a public-spirited citizen, with the qualities of mind and personality to translate her abilities into action and make her work effective. She has been prominently identified with civic movements in Chicago for many years, and has a well-deserved place of her own in the city's "Who's Who." They were married in 1904, and the similar pattern of their lives, based on mutual interest in the improvement of things as they are, has flowered into the peaceful afternoon of an unusual and lovely family life. They have one son, Dr. James Howe Britton, who is doing a good job on his own for International Harvester at Moline.

DR. BRITTON will be succeeded as Supervisor of Medical Service for International Harvester by Dr. Will F. Lyon, who has long been Chief Sur-

geon for the company. Dr. Lyon will have two Assistant Supervisors, Dr. Eugene L. Walsh, in charge of medical matters, and Dr. Burton C. Kilbourne, in charge of surgical matters. They, who have grown up with him, and the others at Harvester who knew him, will remember his high ideals in medicine, his higher ideals in industrial medicine, his devotion to what he believed was right, the forcefulness with which he stuck to his convictions, his thoughtfulness of others, his preeminent kindliness, and his affability at all times —excepting when matters detrimental to employee health were under consideration, as to which they will also remember he could be exceedingly blunt and severe.

LEST "remember" imply too much finality of withdrawal, it should be likewise remembered that he is only 65, and it isn't unreasonable that there may be another career ahead of him. If there is, it will involve his dream. Early in his experience, probably about the time he saw the field of industrial medicine taking shape and direction, he began to realize that the day would arrive when there would be the urgent need for more than the practice of this kind of medicine. He looked forward to the inevitable demand for agencies of instruction in it. With many others, he saw its problems becoming, increasingly, the problems of the general practitioner. Well enough that the men who made industrial medicine were able to handle it. But its progress wouldn't stop with the large companies. It must go on to the small. The pioneers would become the older generation, requiring to be aided while they were here, and succeeded when they were gone. It took the crisis of the events in Europe to bring this to the attention of organized medicine so forcibly that something is being done about it. But the majority of the men who will be called to assist and replace the leaders don't know, and there isn't time for them to learn by serving such apprenticeships as those who are now too busy to teach them had to serve. And they haven't been able to learn in school; the average undergraduate doesn't even have it brought to his attention by way of the curriculum that there is any such thing as industrial medicine. There should be the means for at least a preliminary education. This is being realized at last; the message of the men who have been crying in the wilderness for the establishment of such means, for medical-school attention to industrial medicine, for educational facilities available to the many to supplement the practice familiar to the few, has become a doctrine of urgency.

With this in mind, some years since—and somewhat ahead of the general flurry of the present—DR. BRITTON interested himself in, and gave a great deal of thought and effort to, the establishment at Northwestern University Medical School of a Department of Industrial Medicine. He had two things in view.

One was the approach of the private practitioner to industrial medicine. If his first contact with it has no background of acquaintance with its peculiarities, he is very likely to begin where first aid began 25 to 30 years ago. He can't overtake in a minute the transition from first aid to complete medical service which has been the evolution of industrial medicine in the last quarter century. Nevertheless, he will have to get ready in a minimum of time. He should be able to go to the university to get ready. Now that preparation *can* be taught, it *should* be taught.

The other was that the university should be the one place where industrial hazards, processes, mechanics, chemistries and substances can be studied in the terms of their industrial applications independently and factually, and with the authority of the quality of research that does not have to inhibit its findings because it might step on somebody's toes in putting them forth.

A strong and independent University Department of Instruction and Research in Industrial Medicine—that was his dream!

Happy in the knowledge that industrial medicine is now encompassing the humanitarian as well as the economic, and that, in this respect, his work has not been without its permanent values, his next great step, no doubt, will still be his dream. Having foreseen the need as well as the time of the need, it is not to be supposed that his retirement from active service at Harvester will draw the curtain on his deep interest in the consummation which is so close to his heart. Indeed, there is more than a hint that he is working and will continue to work on the probability of an endowed department which will realize his vision, strong enough to stabilize the men who know, competent enough to solve for all industries the problems that so many are having to solve for themselves. If the future holds for him that such a department will materialize, and that JAMES ANDREW BRITTON becomes its head, the eventuality will eminently crown the logic and the idealism of his life.

Dispensary

THE Committee on Healthful Working Conditions of the National Association of Manufacturers, publishes the following suggestions for an industrial dispensary:

FOR factories of 200 employees or less, the medical dispensary should have approximately 125 square feet of floor space with a partition or semipermanent screen dividing it into two rooms. It should be situated as near production equipment as possible, with the following qualifications kept in mind: (a) quietness; (b) good ventilation; (c) adequate heating; (d) toilet facilities; (e) hot and cold running water; (f) natural and artificial illumination.

It should be painted in light colors, spotlessly maintained; have a waiting bench or seats accessible; and include at least the following equipment: 1 file for medical records; 1 adjustable floor lamp; 1 instrument cabinet; 1 folding stretcher; 1 cot; 1 stool; 1 table, enameled top (kitchen size);

2 white enamel chairs; 1 sanitary can with cover; 1 portable first-aid kit; 1 small sterilizer (gas, electric, alcohol, steam or oil); and small equipment, such as basins, two-quart pitcher, appropriate instruments.

Estimated total cost, including construction of walls of room—$300.00

FOR factories employing between 200 and 500 employees, there should be approximately 300 square feet of floor space, divided into two rooms. They should be situated as described above for smaller factories, and should contain at least the following equipment.

In the treatment room there should be: 1 file for medical records; 3 chairs, white enamel; 1 adjustable floor lamp; 1 instrument cabinet; 1 sanitary can with cover; 1 folding stretcher; 1 portable first-aid kit; 1 stool; 1 chair, white enamel, with head-rest; 2 tables, enameled top (kitchen size); 1 small sterilizer (gas, electric, alcohol, steam or oil); and smaller additional equipment, such as basins, pitchers, foot baths, arm baths, and appropriate instruments.

In the examination room there should be: 1 cot; 1 stool; 1 scale; 1 examination table; 1 small desk or table; 1 chair, white enamel; and miscellaneous equipment, such as eye chart, blankets, etc.

Estimated total cost, including construction of walls of room—$425.00.

Natural Vitamin A and D Ointment

—Experience in the Treatment of Burns, Varicose Ulcers, and Different Dermatoses—

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THIS report is based on the treatment of burns, varicose ulcers and different dermatoses, in an early series of cases, with a cod-liver oil concentrate ointment and, in a later and parallel series of cases, with an ointment containing a concentrate of natural vitamins A and D from other fish-liver oils. In this report these preparations will be respectively designated as "cod-liver oil concentrate ointment" and "vitamin A and D ointment." The vitamin content of the cod-liver oil concentrate ointment was substantially greater than that of the vitamin A and D ointment but in each preparation the ratio of vitamin A to vitamin D was approximately that present in cod-liver oil. The ointment base of both preparations was essentially a lanolin-petrolatum mixture and, without the addition of vitamins A and D, was used in a certain number of cases as a control. The vitamin A and D ointment, unlike the older preparation, was free from objectionable odor and excessive oiliness.

Clinical Status of Vitamin A and D Ointments

IN 1936, the A.M.A. Council on Pharmacy and Chemistry, after considering the evidence from the literature, concluded "that the whole subject of cod-liver oil treatment of burns and wounds is still in the experimental stage."[1] Prior to 1936, an extensive array of foreign reports, attesting the value of the cod-liver oil method of treating burns and wounds and initiated by the publication of Löhr's original experience with the local use of a cod-liver oil salve, had been added to the literature. Within recent years, a small but increasing number of similarly favorable papers has appeared in the American literature, but at the present time apparently only limited attention has been given the cod-liver oil method in America.

Among the pertinent literature in this country, Brandaleone[2] observed early healing in all but one of 21 cases of chronic diabetic ulcers of the feet treated with topically applied cod-liver oil. Driver, Binkley and Sullivan[3] reported excellent results in 25 cases of indolent ulcers treated with a cod-liver oil ointment or with a pro-vitamin A ointment. Berlien and Davis[4] obtained unusually good results in major burns with a cod-liver oil ointment and plaster bandages. Meherin and Schomaker[5] recommended the local use of cod-liver oil for cement burns. Banyai[6] observed dramatic results with the application of cod-liver oil in tuberculous pharyngitis and laryngitis. Puestow, Poncher and Hammatt[7] conducted controlled studies of experimentally produced burns in pigs and rabbits and demonstrated that a cod-liver oil ointment and ointments containing vitamins A and D from other fish-liver oils caused a much more rapid rate of healing than was observed in control lesions or burns treated with tannic acid.

Recently, Hardin[8] published a comprehensive review of the literature up to 1941 on this subject and presented his observations of striking results obtained with the cod-liver oil method in burns and wounds. His experience with ointments of cod-liver oil or other fish-liver oils in 22 major burns, 39 minor burns and 285 assorted clean and infected wounds leads him to recommend the topical use of vitamins A and D as a superlative method of local wound therapy in both clean and infected wounds of all types and in both new and old burns of major severity.

The local treatment of burns in hospital practice is usually with tannic acid or other coagulant methods. Since the popularization of the tannic acid or other coagulant therapy, ointments and oils have evidently fallen into disfavor because of their poorer action in preventing external fluid loss from the burned surface. Hardin[8] emphasizes that in severe burns the external loss of fluid is insignificant when contrasted with the great diffusion of plasma into surrounding tissues and that such fluid diffusion can be minimized by the use, in conjunction with the cod-liver oil method, of a large, dry gauze pressure — a procedure demonstrated by Allen[9] and by Noland and Wilson[10]—or by using plaster bandages recommended by Löhr and others as an adjunct to treatment with cod-liver oil ointment. Primarily, successful treatment of burn shock depends on adequate fluid restoration preferably by plasma transfu-

sions and would not appear to be influenced materially by local therapy.

Within recent years certain disadvantages have been reported as associated with coagulant methods of treating burns. Wakeley and McIndoe,[11] MacCollum,[12] Hardin[8] and others warn that the results of coagulation treatment of burns of the face, hands, feet, axilla, groin and perineum can produce circulatory impairment and ultimate contractures. Increased liability to infection under the coagulum and interference with the production and distribution of reparative tissues are among other disadvantages clinically reported with the tannic acid method, according to Hansen[13] in a review of burn therapy.

Cases Treated in Present Study

A TOTAL of 93 patients was observed, 48 with second-degree burns—mostly fresh and of limited areas, 30 with varicose ulcers and 15 with skin sequelae from x-rays and infected wounds. These patients included with one exception only ambulatory cases. The results reported represent the unanimous opinion of all in charge.

Burns (mostly second degree) of Limited Areas

THIRTY-THREE cases with burns (usually fresh) of second degree, that were limited to either the face, arm, leg or hand, etc., were treated with a preliminary soap and water cleansing followed by a sterile rinse and opening of blisters. The wound was then dressed with a thick coating of the ointment covered with sterile gauze and an occlusive gauze bandage applied. This was left in place for one week as a rule unless the bandage slipped. Dressings on the face were changed more often. No other medication was applied. Primary and secondary shock did not appear. Sedative drugs were not required.

The first thing noted, and of immense relief to the patient, was a prompt diminution or absence of pain usually associated with burns. This relief from pain was present during the entire time while the bandage was in place and obviated the use of a sedative. This was noted also in four cases that had complained of pain while being treated with other methods including a tannic acid jelly. About one-half of the burns occurred in infants and children. The infrequent dressing was a boon not only to the little patients but also to those who took care of them.

The appearance of the wound at the first and subsequent dressings was clean, although some discharge was present. New blisters failed to appear. Infection developed in one case owing to improper care in keeping the dressing in place, and in two other cases from carelessness and filthy surroundings. Odor was noted from the cod-liver oil dressing but was much less noticeable with the deodorized preparation.

The healing of the burns varied with the severity and location of the second-degree burn. Healing appeared to occur earlier with the vitamin A and D ointment—in about 12 days—than with the cod-liver oil concentrate ointment. The cosmetic result was unusually good, either no scar was visible, or in those with destruction of the dermis a fine supple scar was present. No contractures or deformity developed. Of the 33 cases treated, 27 healed nicely.

In the 15 cases of burns of similar degree treated with the control base (ointment without cod-liver oil or vitamins A and D), the pain continued to annoy the patients, two developed infection and only three continued to make revisits until healed. The others failed to return for subsequent dressings, indicating in view of the steady revisits of those treated with the vitamin medicated ointment that they were dissatisfied. In the three cases that completed treatment with the con-

TABLE I
SUMMARY OF TREATMENT OF 48 CASES OF BURNS OF LIMITED AREAS

Number of Cases	Degree of Burn	Treatment	Average Healing in Days	Comments
16	2°	Cod-Liver Oil Concentrate Ointment	13*	Immediate relief from pain. Good cosmetic results. Four patients failed to return for final visit—wound almost healed when last seen.
1	2°	"	60	Severe second-degree burn with some destruction of tissue of hands. Soft scar.
1	2°	"	(?)	Infection developed.
9	2°	Vitamin A and D Ointment	12	Immediate relief from pain. Prevented development of blisters in some cases. Three patients failed to return for final visit—wound almost healed when last seen.
1	1°	"	8	First-degree burn of face, neck, chest, shoulders. Preferred cod-liver oil ointment.
3	1°-2°	"	(?)	Failed to return after first visit.
2	2°	"	(?)	Infection developed.
3**	2°	Control Base	17	Healed slowly. Patients complained of pain.
4	2°	"	(?)	Failed to complete treatment—dissatisfied.
6	1°	"	(?)	Failed to return after first treatment—dissatisfied.
2	2°	"	(?)	Infection developed.

*Four cases had been treated with various preparations from five days to three weeks prior to treatment with cod-liver oil concentrate ointment; one case with tannic acid jelly for three days.

**One of the patients had cod-liver oil concentrate ointment used on several fingers and the control base applied to the others—healing was more rapid with the cod-liver oil concentrate ointment.

TABLE II
SUMMARY OF TREATMENT OF 30 CASES OF VARICOSE ULCERS OF THE LEGS

Number of Cases	Treatment	Concurrent Treatment	Average Duration (Including Relapses)	Average Healing in Days	Results	
	Cod-Liver Oil	8—Zinc	5—About 1½ years	96	Cured	
10	Concentrate Ointment	Gelatin Boot	5—About 2 years	102	Improved	
9	"	4— "	4—About 8 months 5—About 4 years			Discontinued visits or showed no results.
6	Vitamin A and D Ointment	1% Brilliant Green and Elastic Adhesive Bandage	5½ years	50	Cured	Epithelialization accelerated. No irritation from ointment. One developed dermatitis from elastic adhesive bandage.
2	"	"	1—2 years 1—4 years			Not cured—failed to return for further treatment. One required hospitalization, developed infection.
3	Control Base	Zinc Gelatin Boot	1—3 weeks 1—6 months 1—10 years		None Healed	One failed to return for further treatment. Two showed slight improvement but preferred cod-liver oil concentrate ointment.

trol base, the healing time was prolonged for about five days. This estimate is based on the other cases observed (See Table 1). The usual time for healing of an ordinary second-degree burn is considered about 10 to 12 days.

Our results indicate that the use of vitamin A and D ointment in the local treatment of burns of limited extent and of second degree is preferable to other measures. This is in agreement with many investigators who have used similar preparations. One of our burns had been treated with tannic acid jelly for three days with little improvement, but the cod-liver oil concentrate ointment caused steady epithelization in this case.

The vitamin medicated ointment deserves wider attention in the treatment of burns, fresh or old, of limited areas. It is simple to use, painless, nonstaining and requires infrequent dressings. In the light of evidence available in the literature, the local use of vitamin A and D ointments in more extensive and severe burns of the body would appear to merit further trial.

Varicose Ulcers of the Legs

THERE were 30 cases in this series (See Table 2). Practically all of these had been treated in various ways; some with sclerosing injections of the veins, others with ointments; and some silver nitrate solution or silver leaf. Most had had a zinc gelatin boot or an elastic adhesive bandage applied. Cases were selected only when little or no improvement followed such treatment.

Fig. 1.
Dermatitis cruris with ulcerations of four weeks' duration in a diabetic woman (Mrs. M. McD.) aged 54, October 4, 1940, before treatment with vitamin A and D ointment

Fig. 2.
Dermatitis cruris with ulcerations in a diabetic woman (Mrs. M. McD.) aged 54 years, October 28, 1940, after treatment with vitamin A and D ointment for 24 days

Nineteen were treated with cod-liver oil concentrate ointment. The preparation was applied to the ulcerated area or areas after suitable cleansing. A zinc gelatin boot was placed over this dressing and left in place one or more weeks. Five were healed after a various number of such dressings, and five showed considerable improvement. It took as much as three months or more to produce these results. Nine showed no results or complained of irritation, or discontinued visits.

Three cases of varicose ulcers were treated with the control base and a zinc gelatin boot. Two of these showed only a slow improvement. One of the latter was then treated with the cod-liver oil concentrate ointment. This patient found such dressings more comfortable than the control ointment base. The healing of the ulcer, however, continued slowly.

The results were better with the vitamin A and D ointment in eight cases of varicose ulcers of the legs. Six were cured in an average of 50 days, one failed to revisit, and one required hospitalization. A photograph of one case (see Figs. 1 and 2) in which the ulceration occurred in a diabetic woman, cleared up in 24 days. In this group, after proper cleansing of the ulcers, they were painted with 1% aqueous solution of brilliant green, then covered with vitamin A and D ointment on gauze, and then sealed with an elastic adhesive bandage. This was left on in place for one or more weeks, or as long as comfort permitted. An unpleasant odor from the dressing was detectable after the dressing was on more than one week, but there was no complaint about this from the patient. This odor was much more noticeable with the cod-liver oil concentrate ointment. Some of the healed ulcer patients, owing to failure to wear a supportive bandage, had a relapse later, but this is to be expected in those with persistent or recurrent varicosities. The treatment outlined above in those with an ordinary or varicose ulcer appeared to be superior to other methods. In addition, this should be supplemented by injections and surgical measures for the obliteration of any varicosities present. Any peripheral vascular disturbance or systemic disease should receive attention also.

X-Ray Sequelae, Infected Wounds, Trophic Ulcer

THERE were 15 cases in this group (See Table 3). Two ulcers and one with atrophy and telangiectasia following x-ray therapy obtained relief from pain both from the cod-liver oil concentrate and the control base. The former caused healing of the ulcer in one case and accelerated healing in the other. All three patients preferred the control base later because it made the atrophic skin more supple.

There was a softening effect on two x-ray keratoses by the use of vitamin A and D ointment. Irradiated petrolatum was preferred in one instance.

The vitamin A and D ointment cleared up the infection in a lacerated finger stump and in another case with an infected wound of the scalp, after other treatments with various antiseptics had failed.

An interesting case was a trophic ulceration of the knee associated with scleroderma. This wound kept on enlarging in spite of the use of Mellany's zinc peroxide paste and sulfanilamide powder. Vitamin A and D ointment sealed with an elastic adhesive dressing caused a slow but steady epithelization of the ulcer.

Two keratoses, one verruca vulgaris and one epithelioma of the hand were removed by electrocoagulation. The resultant wound showed rapid

TABLE III

SUMMARY OF TREATMENT OF 15 ASSORTED CASES (X-RAY SEQUELAE, INFECTED WOUNDS, TROPHIC ULCER)

Number of Cases	Type of Dermatoses	Treatment	Average Healing Duration	Average Healing in Days	Comments
3	X-ray sequelae (2 with ulcers 1 atrophy and telangiectasia)	Cod-Liver Oil Concentrate Ointment	6½ years	70	One ulcer healed. One ulcer almost entirely healed in 60 days. Relief from pain. Softened skin.
3	Same as above	Control Base			Relieved pain. Preferred control base as it makes skin soft.
2	X-ray keratosis	Vitamin A and D Ointment	2 years 24 years		Keratosis softer.* Didn't return for further treatment.
2	Infected wounds Lacerated finger stump Lacerated scalp	" "		20	Earlier antiseptic dressings ineffective.
1	Trophic ulcer (Scleroderma)	"		63	Zinc peroxide paste and sulfanilamide powder not as effective as vitamin A and D ointment.
4	Wounds following electrocoagulation of 2 keratosis 1 wart 1 epithelioma	"		24 (for 3 cases)	Vitamin A and D caused rapid epithelialization. One case (wart of toe) balsam Peru had to be used.

*Later removed by electrocoagulation.

epithelization under a dressing of vitamin A and D ointment. However, the wound following the removal of the wart on a toe healed slower than usual, finally responding to balsam Peru dressing.

Discussion

IN the present study, 27 of 33 cases of burns, or 80%, healed nicely with either cod-liver oil concentrate or vitamin A and D ointment. The latter appeared the more effective of the two in accelerating epithelization of the wound. This slight degree of difference in rate of healing may be explained by the possibility that the vitamin content of the cod-liver oil concentrate was too great, and that of the vitamin A and D ointment more correct, for optimal healing. Löhr and Unger,[14] for example, found that the local use of an excessively high concentration of vitamins A and D retards rather than accelerates healing. The 15 cases in which the control base was used responded poorly or not at all (See Table 4).

TABLE IV

SUMMARY OF RESULTS IN THE TOTAL OF 93 CASES

Treatment	Results	*Burns* No.	*Burns* %	*Varicose Ulcers* No.	*Varicose Ulcers* %	X-ray Sequelae Infected Wounds *Trophic Ulcer* No.	X-ray Sequelae Infected Wounds *Trophic Ulcer* %
Cod Liver Oil Concentrate Ointment or Vitamin A and D Ointment	Favorable	27	80	16	60	9	75
"	Unfavorable	6	20	11	40	3	25
Control Base	Favorable	3	20	0	0	3	?*
"	Unfavorable	12	80	3	100	0	0
Total of 93 Cases		48		30		15	

*The three cases (x-ray ulcers and atrophy of the skin) treated with control base are listed as favorable, as based on the patients' statements that the control base was more comfortable and kept the skin softer than the cod-liver oil concentrate ointment.

The effects in the other cases were not as striking, yet 16 out of 27 varicose ulcers that had not responded to other treatment healed, with relief from pain and other discomforts associated with this condition. One of the two x-ray ulcers healed completely, the other partially. The relief from pain in both cases was striking. As a dressing after removal of a growth by electrocoagulation, the vitamin ointment was also effective in keeping the pain down to a minimum and accelerating epithelization.

Granted that an ointment containing the natural vitamins A and D from cod-liver or other fish-liver oils has its therapeutic usefulness, the question arises whether it is due to the vitamin A or vitamin D component separately, combined, or to some other factor. The ointment vehicle apparently does not need to be considered judging by the unfavorable action in most cases in which the control ointment base was used.

While vitamins A and D are absorbed through the skin, it is more practical and economical for systemic action to administer them orally or parenterally. For local effects it is probably best that the tissues come in direct contact with the vitamins instead of through the circulation. Degeneration of the normal epithelial structure is a characteristic of vitamin A deficiency. If the vitamin A is furnished the tissue by local application, it is fair to assume that some of the acceleration of epithelial regrowth in the healing of wounds may be attributed to the vitamin A. The provitamin A, carotene, incorporated in an ointment is reported also to stimulate healing of burns and wounds.[15]

According to experiment conducted in vitro by Dalldorf,[16] vitamin D is a powerful stimulant to epithelial growth in the presence of vitamin A. Getz[17] performed a series of studies in vivo, using guinea pigs with experimentally produced tuberculous ulcers of the skin, and observed that a combination of vitamin A and D present in the proportion found in cod-liver oil is essential for optimal stimulating effect. Any bactericidal or bacteriostatic action of the cod-liver oil or other fish liver oils is probably also of help. These various factors may all play a part in the beneficial results obtained.

Summary and Conclusions

A TOTAL of 93 patients; 48 with fresh burns of a limited area, 30 with varicose ulcers, and 15 embracing skin sequelae following x-ray irradiation and infected wounds were treated, some with a cod-liver oil concentrate ointment and others with an ointment containing a concentrate of natural vitamins A and D from other fish-liver oils. The ointment vehicle (essentially a lanolin-petrolatum mixture) without the active vitamin ingredients was used in a control series.

Eighty per cent of burns of limited area, mostly second degree, healed quickly with good cosmetic results, with little or no pain or infection. There were no contractures. The vitamin A and D ointment caused more rapid healing than the cod-liver oil concentrate, perhaps, because the vitamin content of the former was better adapted to the production of optimal healing. The control base showed itself ineffective.

Varicose ulcers of the legs were cured or markedly improved in 60% of the cases. Application of 1% aqueous solution of brilliant green and an elastic adhesive bandage in addition to the vitamin A and D ointment gave the best results. The ointment base with similar concurrent antiseptics and supportive bandage was ineffective in three control cases.

Two cases with ulceration sequelae and one with atrophy and telangiectasia from x-ray obtained relief from pain with the vitamin A and D ointment, but also from the control base. One ulcer healed, another partially healed with the medicated ointment. Some softening effect was obtained in x-ray keratoses.

Infected wounds, two cases, cleared up rapidly with vitamin A and D ointment after earlier antiseptics had failed to stop the infection. A trophic ulcer in scleroderma also responded in this way.

Dressings with vitamin A and D ointment after removal of four growths by electrocoagulation caused acceleration in the healing of such wounds except in one case.

When applied locally in an ointment base, the natural vitamins A and D stimulate wound healing, especially epithelization.

Some of the beneficial effects may be explained also by the possible bactericidal or bacteriostatic action of the fish-liver oils incorporated in the ointment base.

It is a simple treatment and is safe and easy to apply. It is extremely suitable in ambulatory patients with burns of limited areas, varicose ulcers and ulcerations following x-ray, trophic disturbances and as a dressing for wounds following electrocoagulation.

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[NOTE: The preparations used in this study were furnished by White Laboratories, Newark, New Jersey.]

Preserve the Art

AS I have observed the changes in medicine from time to time, I have been increasingly apprehensive concerning the nursing situation. I am highly conscious of the fact that criticisms of some of the present trends in nursing may meet with far from approving reactions on the part of the nursing profession. Since I speak as one in daily contact with the nursing problem at the bedside, in an executive capacity and in its specialized branches, I am at least qualified by experience to make some observations concerning it. I have been fearful for a number of years that the trend in nursing is away from service to the patient and too much in the direction of higher education. I have been fearful lest the higher and higher standards of requirements for entrance and graduation in nursing might not make it more and more difficult to obtain a sufficient number of nurses to meet our increasing demands. This is an apprehension which our present situation as relates to nurse shortage indicates as being more and more justifiable. What with the demands made on nursing at the present by army service, by public health, by industry and by other special branches in nursing, together with the relatively high cost of nursing for patients, it is necessary for nurses, physicians and legislators to have in mind at least the possibility of the employment of the practically trained nurse to meet the financial demands of the situation and the lack of personnel in the way of trained and registered nurses. It is really no exaggeration to say that, with many of the personal attentions to patients delegated to ward maids, the real art of nursing can be lost to the nursing profession.—From "Current Problems of American Medicine," by FRANK H. LAHEY, M.D., in *J.A.M.A.*, June 7, 1941.

Central States Society

—Mid-Winter Clinic, December 5, 1941—

—Tentative Program—

MORNING SESSION, 9:00 TO 12 A.M. COOK COUNTY HOSPITAL, Chicago: Clinic—Demonstration.

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"Neurological Cases"—DR. A. VERBRUGGHEN, Chicago.

"Diseases of the Skin"—DR. DAVID V. OMENS, Chicago.

"Hand Infections—Diagnosis and Treatment"—DR. MICHAEL L. MASON, Chicago.

"Cardiovascular Disease"—DR. CHAUNCEY C. MAHER.

"Peripheral Vascular Disease"—DR. CHESTER C. GUY.

AFTERNOON SESSION, 2:30 TO 5:30 P.M. PALMER HOUSE:

"Medical and Surgical Service in a Large Plant"—DR. J. H. CHIVERS, Chicago. Discussion—DR. FRANK SMITH, Chicago.

"Preventive Medicine in Industry (small plants)"—DR. C. O. SAPPINGTON, Chicago. Discussion—DR. O. A. SANDER, Milwaukee.

"Hospital Management of Industrial Cases"—DR. S. PERRY ROGERS, Chicago. Discussion—DR. E. C. HOLMBLAD.

"Insurance and Compensation Aspects of Industrial Medicine and Surgery"—MR. AMBROSE KELLY, Chicago. Discussion—MR. FRANK ATKINSON, Chicago.

"Nursing Service in Industry"—MISS JOANNA M. JOHNSON, R.N., Milwaukee. Discussion—MISS GERTRUDE JAEGER, R.N., Chicago.

DINNER SESSION, 7:30 P.M. PALMER HOUSE, Chicago:

ROUND TABLE DISCUSSION: Head and Back Injuries:

"Diagnosis"—DR. PAUL C. BUCY, Chicago.

"X-Ray Demonstration"—DR. HOLLIS E. POTTER, Chicago.

"Orthopedic Aspects"—DR. HERMAN SCHUMM, Milwaukee.

"Neurological Phases"—DR. LEWIS J. POLLOCK.

"Treatment"—DR. ERIC OLDBERG, Chicago.

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The Dispensary

STATISTICS on absenteeism rather generally fail to include absences of short duration. Thus, to cite an example or two, in DR. SIMON'S study of absenteeism in a hat-manufacturing plant (INDUSTRIAL MEDICINE, August, 1941, page 320) the absences among 2200 workers of both sexes were those "of three days or over and under 56 days." DR. LANZA, at the Third Annual Congress on Industrial Health, in January, 1941, mentioned a study among the employees of a public utility company, 1933-1937, regarding the average number of colds, "disabling for one day or longer." Such a basis is usual; the half-day or less, is omitted, and the indisposition with no absence at all isn't counted.

Aside from injuries, it is probable that many causes of absence do not become definite enough to tabulate until something develops which is sufficiently marked for diagnosis and the assignment of a cause within the category of conditions that need to be treated. This requires a little time. During the interim about the only thing of which either the employee or the doctor can be certain is that the employee does not feel well. He may or may not continue to work. It is safe to say, however, that a great many who merely aren't feeling well continue to work rather than lay off, so that the number of employees at any time hovering on the edge of a condition which might result in an accountable absence is very much larger than the number of those who come to be reportable after having been absent. Thus, the aggregate of small-period inefficiency in any plant may be greater than is thought possible.

Here is where the dispensary service proves its worth. Not only is it the means of first-aid in the situations that usually require it, but also it is a service of immense value as a means of first-aid to indisposition. Where employees are encouraged to use the dispensary freely and frequently, the result is that a vast number of indispositions—which, if it were not for the dispensary service, would undoubtedly become serious enough to result in an accountable absence—are headed off at source. This is so true, indeed, that a high dispensary call rate is indicative of the success of the company health service. In addition to being an excellent means of prevention—as to the minor malaise with no absence becoming a major illness resulting in an absence—it reflects the general value of the health service in that the employees know of it, believe in it, and use it, as a matter of their own cooperative interest in prevention. After all, prevention isn't a single-file street; the heading-off at source acknowledges the early cure as a shoulder-to-shoulder companion.

Suture Material

THE choice of suture material, an important factor in all fields of surgery, is of particular importance in traumatic surgery. It has a definite bearing on the rate of wound healing and the prevention of infection. Also, it is of special interest in connection with the suturing of tendons and nerves.

It can safely be asserted that the use of cat-gut should be minimized. When cat-gut dissolves in tissues definite chemical irritation ensues. This produces a wound reaction which predisposes to infection and retarded healing. It is not good surgery to use heavy cat-gut with accompanying thick, bulky knots. When used, cat-gut should be of the very finest size compatible with requirements. The very finest cat-gut should be used for ligating bleeders, and then only the vessel itself should be tied and not a mass ligation of surrounding tissues, which in itself will cause an area of tissue necrosis. Except for the suturing of tendons and nerves, a minimum of fine interrupted sutures should be used in the other structures. As a matter of fact, assuming correct cleansing and debridement have been carried out, the results will be improved if the use of cat-gut is confined to the finer sizes and otherwise curtailed.

It is our feeling that the suture materials causing the least tissue reaction are cotton and fine stainless steel wire, irrespective of whether they

are used as deep buried sutures which are not removed, or as removable skin sutures. It is a strange fact, though seemingly true, that cat-gut (although absorbable) causes a foreign body reaction, whereas such reaction is negligible or absent with cotton or stainless steel wire. Silk seems to occupy an intermediary position. Skin sutures of stainless steel wire or cotton can be left in for weeks without causing appreciable reaction. Tissue takes to stainless steel wire so kindly that granulation tissue will grow over it, completely burying the knot and part of the ends. When buried, the fine wire eventually breaks up into fragments due to corrosion. One disadvantage of wire, of course, is that when buried, the projecting ends theoretically cause some irritation. This can be lessened by bending them over with a fine hemostat, but even without bending them over and in using them as buried sutures, in superficial tissues, it is remarkable how infrequently evidence of the projecting ends causing irritation is present. Such irritation occasionally gives rise to a slight pricking sensation which soon subsides, but the irritation does not manifest itself in any impairment of the quality or rapidity of wound healing, though it may conceivably occasionally stimulate a few adhesions of the skin to the structures underneath.

Herniotomies done exclusively with cotton, except for skin clips for the skin, yield results definitely superior to those in which cat-gut is used. Operations for hernia performed with stainless steel wire or silk instead of cat-gut, similarly show an improvement by comparison. The same applies to abdominal wall closure.

Several years ago, becoming dissatisfied with silk in tendon suture, we began the use of fine stainless steel wire and have since continued it with gratifying results. Bunnell also indicates a strong preference for this wire in tendon suture. His method consists in a special technic in which the wires are drawn through the skin and can thus be subsequently removed. In our practice, we have left the buried sutures alone since only a single knot is tied and, if desired, especially in the case of flexor tendons, projecting ends can be eliminated by a special stitch burying them in the body of the tendon.

In office practice, it is especially important to avoid irritation by suture material. Here again, the use of stainless steel wire, cotton or skin clips is valuable. After thorough cleansing and debridement, a technic using one of these three materials in which the wound is not touched during the suturing, helps reduce infections to a minimum.

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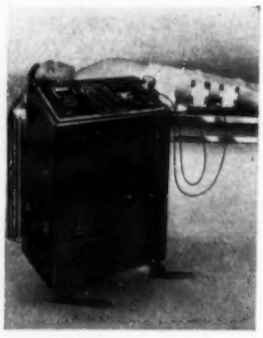

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BOOKS

Occupational Diseases

Review by

CAREY P. McCORD, M.D.,
Director, Industrial Health Conservancy Laboratories, Detroit

THE ESSENTIALS OF OCCUPATIONAL DISEASES, by J. V. REED and A. K. HARCOURT, 225 pages, $4.50. Charles C. Thomas, Springfield, Illinois.

IN every sport and in many professions, there is the "players' player," the "golfers' golfer," the "actors' actor." Thus Spencer Tracy long has been acclaimed by the esoteric among movie actors as the initiates' choice. In the world of industrial hygiene and occupational diseases, there is little of esoterism albeit some disposition to indulge in "ex cathedra" appraisals. Within any hallowed group, this new book on occupational diseases by Reed and Harcourt may be rated merely as a compilation of the obvious. This charge is granted, but let it be remembered that the literati painfully laid aside "Gone with the Wind" after about page 17, as unworthy of a library shelf. For every physician to whom a variety of occupational diseases is a day-by-day story and for whom this book may be puerile, there are some 5000 other physicians for whom this book may prove a new discovery, a beguiling adventure. Unfortunately it remains true that despite a thousand statements contrariwise, some good and true physicians still are willing to believe that silicosis may be caused by oatmeal dust, or that electro-magnetic fields may cause infantile paralysis. For the great mass of physicians who not yet have been captivated by intriguing occupational diseases, this book may well serve as a catalyst for interest. Nor have its authors claimed otherwise; they state as a portion of their preface:

"We have analyzed the literature for expert opinions that have been published during the past few years. We realize that the subject is a rapidly growing one and that opinions change from year to year as new facts are learned, but we have taken the essential facts that have been established to date and have codified them in practical form for daily use. As these notes have proved of value to us, we conceived the idea that they might also be of use to others doing work in industrial medicine and surgery."

For some 120,000 novitiates in the friarhood of occupational diseases, this book records the commoner features of scores of chemical poisonings from "acetaldehyde" to "zinc chloride." The content of six other chapters calls for mention. In one, consideration is given to those physical agents that may be responsible for occupational diseases, from heat to noise. A third and good chapter is devoted to trade dermatoses. The remaining ones provide a thin layer of covering for dusty lung diseases, occupational cancer, infectious industrial diseases, and lastly a brief review of functional disturbances from work.

Of Swedenborg's writings it has been said that had they been presented to the world, not as a religion, but as a philosophy, they would have captured many millions of persons. Of the book under review, equally it may be said that its value wholly depends upon the reading group to which proffered. This elemental publication will serve a genuinely helpful purpose if used by general medical practitioners, students, nurses and lay personnel in industry. For a long time the hope has existed that an occupational disease book on the nursing level might appear. Here is the book needed but slightly disguised as a reference text for industrial physicians.

X-Ray Atlas of Silicosis

Review by

JAMES T. CASE, M.D.,
Chicago

AN X-RAY ATLAS OF SILICOSIS. By ARTHUR J. AMOR, M.D., London), M.Sc. (Wales), Honorary Physician, Clydack Memorial Hospital, Medical Officer, Mond Nickel Co., Ltd., Swansea. With a translation of the legends into French by Robert E. Horne, M.A. (Wales), Medical Secretary, Mond Nickel Co., Ltd., Swansea. Foreword by Sir Wilson Jameson, M.A., M.D., (Aberdeen), F.R.C.P., of the Middle Temple, Barrister-at-Law; Dean of the London School of Hygiene and Tropical Medicine. Pp. 206, with 72 plates. Price $8.00. Baltimore: The Williams and Wilkins Company, 1941.

SILICOSIS has masqueraded under various popular and scientific names since ancient times, says the author, but only within the last 30 years has practical application of the x-ray method to the study of the lungs made the precise diagnosis possible and permitted differentiation between silicosis and pure tuberculous phthisis and the commonly encountered combination of both diseases. Still too few physicians are acquainted with this disease, although it is one of the outstanding occupational infirmities. The interest in silicosis and other occupational diseases, manifested not only by various employer and labor groups, but also by government health agencies, makes this a

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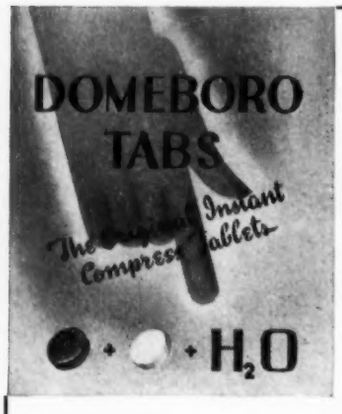

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*Levin, O. L., and Behrman, H.T., Industrial Medicine, Feb. 1941

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timely publication. As the author says, silicosis is a major risk in a surprising number of industrial processes and a curse in some industries. A complex mass of legislation has been enacted to deal with the ravages of silicosis and to control it, as might be anticipated, and there also has grown up a considerable volume of medicolegal abuse, through the desire of certain attorneys to turn to profit the difficulties of excluding silicotic involvement in its early stages when the x-ray findings are not decisive.

This excellent atlas setting forth the essential radiological features of silicosis is intended for senior medical students, industrial surgeons and others whose work brings them in contact with industrial diseases.

The text concerns the etiology and the criteria of risk from dust inhalation; the pathology of simple and infective silicosis or silico-tuberculosis; the radiological examination of the lungs, including the normal and pathological chest, non-specific and specific changes. Short chapters are devoted to the clinical manifestations and prognosis. The remaining 175 pages of the book contain some 72 plates and a number of figures, with generous descriptive text in English and French. The description of each case directly faces the illustration. The roentgen films are reproduced in the negative; that is, the shadows show the ribs and other densities in white and the various translucencies as dark areas. This corresponds to what we see on the original x-ray film and adds to the value of the publication.

The majority of the cases used for the illustrations have been certified by Silicosis Boards or confirmed by postmortem examination, so it may be assumed that the illustrations represent the conditions stated. The author, himself, well qualified by fitness and experience, has been given the assistance of expert physicians in various industries.

It would not be difficult to find some basis for criticism of any book on one account or another, but so much could be written in praise of this commendable work that criticism seems tame.

Fees and Disability Periods

Review by

C. O. SAPPINGTON, M.D., DR.P.H.
Chicago

STANDARD BODYPARTS—ADJUSTMENT GUIDE. Loose-leaf; 240 pages, with Frohse Anatomical Charts (Latin and English). Price $15.00, including 10 years' revision service without additional cost. Insurance Statistical Service of North America, Chicago.

THE above is the title of a new loose-leaf work arranged to assist all who are interested in the estimation of lost time with reference to traumatic cases, and occupational diseases and disabilities. Its scope includes also disability evaluations, medical fees, and statutory digests of the various States.

This volume should be of interest to everyone coming into contact with traumatic or compensation cases. Industrial physicians will find it particularly interesting in that minimum, maximum, and mean average fees are listed for various operative procedures, so derived from an investigation from 18 States. Lest these fee schedules be misunderstood, it should be pointed out that they are all minimums; the minimum in one State may be higher than in another, and so the highest shown in this book is the minimum for its locality, as is the lowest shown the minimum for another locality. The average, therefore, is the average of minimums. Periods of disability are also listed. This reviewer is not entirely in agreement with them, but it should be remembered that these, too, are not set up to tell the physician what the proper period for any given disability should be, but only to keep him accurately informed as to what it is, in so far as existing practice is concerned. With the thought in mind that the minimum fee and disability listings are based on what has been done rather than what ought to be done, both of these listings will prove vastly interesting, and certainly valuable.

Tabulations are given for the costs of various kinds of injuries, and of the lost time involved in each kind, which are based primarily on the national average of minimum medical fees as aforesaid, and lost time as it is usually reckoned. Correlated with this is the up-to-date digest of compensation laws in the United States and its territories, so that one may use both of these types of information to advantage.

Occupational disease signs, symptoms, and etiological environments are considered in another portion of the service, and there is also a glossary of medical terminology and definitions, which will be particularly useful to those who have not had training in medical nomenclature.

Excellent anatomical photographs and charts are used to good effect in the explanation of the various types of injuries. The book is superbly printed, well arranged, and bound, loose-leaf, in heavy-duty fabricoid.

There is the thought in studying this book that, as to medical men as well as men in other professions, nothing does one so much good, no matter how experienced, as to take an occasional inventory of himself, and his practice, and his charges. This is a volume which one may profitably use to orient himself, subjectively as well as objectively. Its value in that respect alone will be outstanding, particularly to physicians. For the part-time industrial man, who does a part-time volume of traumatic work, its adaptability for ready reference has only to be seen to be appreciated.

INDUSTRIAL HEALTH AND DISEASE

A New Industrial Skin Cleanser

LOUIS SCHWARTZ, M.D.
Medical Director, United States Public Health Service

HARSH skin cleansers have frequently been found to be the actual causes of occupational dermatitis which before investigation seemed to have been caused by the chemicals manufactured or handled. Those workers who handle chemicals which are difficult to remove from the skin by ordinary toilet soaps are the ones mostly affected by dermatitis caused by skin cleansers. Synthetic dye workers, printers, dyers, workers with coal tar, pitch, asphalt, creosote oil, petroleum oils, and soot are apt to use, for cleansing their hands after work, strongly alkaline and abrasive soaps which abrade and dissolve the superficial epithelium of the skin, volatile solvents which defat the skin, and powerful bleaching agents which cause chemical changes in the epithelium by chlorination and oxidation.

The damage to the skin caused by such harsh cleansers not only renders the skin more vulnerable to the action of irritant chemicals, but in many cases is the sole cause of dermatitis.

Sulfonated oils, especially sulfonated vegetable oils, such as turkey red oil (an emulsion of a type of partially sulfonated castor oil and neutral soap), have long been used in industry. Recently, sulfonated vegetable oils have been used in the treatment of dermatitis.[1] Sulfonation of vegetable and mineral oils makes them emulsifying agents and they emulsify dirt and grease on the skin and help to cleanse it. Being miscible with water they can be used as skin cleansers and are of especial value in that the sulfonated vegetable oils do not defat the skin.

[1] In Public Health Reports, 56:36, 1788, September 5, 1941.

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Sulfonated oils are made by mixing the oil in lead-lined vessels with 25-50% by weight of cold concentrated sulfuric acid, maintaining a temperature below 95° F. by slowly adding the acid. The oil is washed free from acid with sodium sulfate solution and then neutralized by the addition of an alkali, such as caustic soda or ammonia.

The degree of sulfonation and the method of neutralization influence the pH of the oil and the amount of SO_3 it contains, and determine its value as an industrial detergent and its suitability as a nonirritating, nondefatting skin cleanser.

A sulfonated vegetable or animal oil to be suitable for skin cleansing purposes should have a pH approximating that of the skin, but free from SO_3, have a fairly high fat content (about 50%), and be completely miscible with cold water.

Castor oil, coconut oil, olive oil, cottonseed oil, and other vegetable oils can all be sulfonated and made into useful skin cleansing compounds.

Petroleum oils can also be sulfonated, but they are not so good for the purpose of cleansing defatted or inflamed skins as are the sulfonated vegetable oils, because sulfonated petroleum oils themselves are fat solvents and the mineral oil contained in them does not replace the fatty matter lost by the skin. The mixing of sulfonated petroleum oils with sulfonated vegetable oils may increase their cleansing properties, but lessens their value as cleansers for dry, defatted skins.

The skin cleansing properties of the synthetic wetting agents, such as the fatty alcohol sulfates, have been known to dermatologists and cosmeticians for many years.[3] They work well even with hard waters and when mixed with soap or other foaming agents make excellent shampoos. These wetting agents, while superior to soap as pure cleansing agents, do defat the skin and may act as sensitizers. They are valuable in the treatment of certain diseases of the skin in which there is an excess of sebaceous or oily material in the skin. They can be manufactured so that their solutions have a wide latitude in hydrogen ion concentration and therefore can be used as "acid soaps" in cases of alkali sensitivity where ordinary alkali soaps are not tolerated.[3]

We have found that the defatting action of the wetting agents can be counteracted by mixing them with sulfonated animal or vegetable oils. We have made mixtures consisting of sulfonated castor oil having a pH of 7.2 and an oil content of 50%, with 2% of one of the wetting agents, Santomerse, Duponol, and Igepon, and have found that it makes a good cleanser and does not defat the skin.[4]

The mixture is used in the same way as liquid soap, which it resembles in appearance, viz, a dram or two is put in the palm and rubbed into the skin and then washed off with water. The cleansing powers of this mixture can be increased without materially increasing its irritant properties by adding an alkali to it, such as trisodium phosphate 1-2%, or sodium hexameta phosphate in the same proportion. However, if the alkali is in excess it imparts a "sting" to the mixture, especially if it gets into cracks or abrasions of the skin.

This formula was first recommended by us to a large oil refining company for cleansing the hands of oil field workers whose skin had become inflamed from previously using kerosene to remove dirt and grease. These workers have used it successfully for over a year.

After a trial, this cleanser has also been installed in the washrooms of a large plate printing establishment, where dermatitis (caused by strong cleansers used to remove dyes from the hands) has been constantly present for many years and where the use of this product has resulted in marked diminution of the number of new cases and a cure of most of the old ones.

In our skin clinic we have been prescribing this cleanser for several months for those cases of eczema and defatted skins in which soap and water are contra-indicated and in which we have previously advised the use of olive oil as a cleanser. The results have been satisfactory in all

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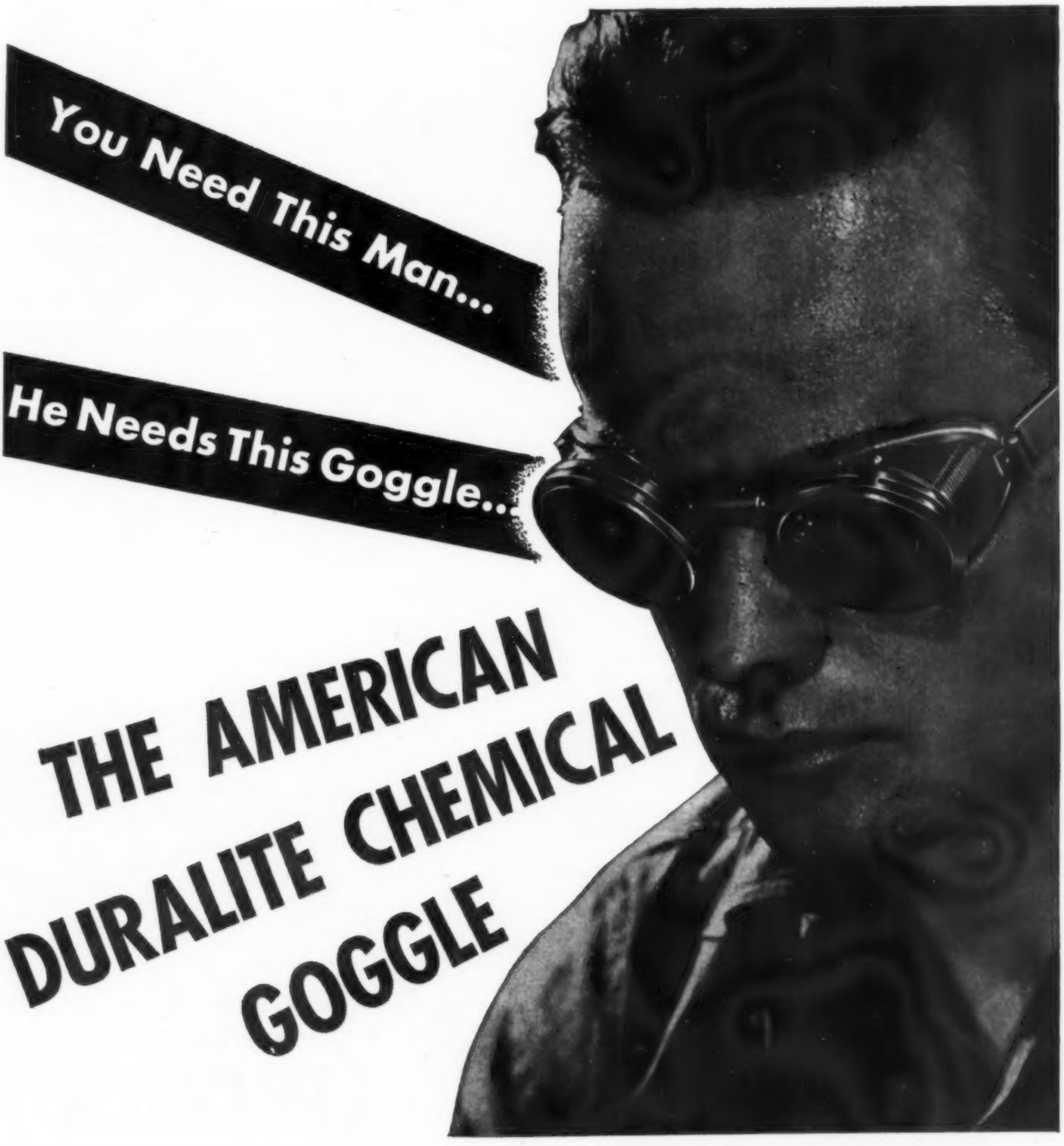

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cases. We have also had success with it in the treatment of atopic eczema in young children, several cases of which cleared up when the cleanser was used and recurred when soap was resumed.

When used as a skin cleanser in eczema, we do not advise the addition of alkali to the mixture because of its "stinging" properties.

When used as a skin cleanser in industrial establishments, workers who have had no dermatitis may object to the odor of the oil or complain that it does not foam as does soap, and some may state that they do not have to use it since their skins are not affected either by the chemicals which they handle or by the cleansers which they use. Therefore, it is suggested that a mild perfume such as lavender or lilac be added in sufficient quantity to hide the odor, and that, in those industrial establishments where dermatitis may occur from harsh cleansers used by the workers to remove extraneous matter from the hands, there should be installed in the wash rooms one or two outlets where this mixture of sulfonated castor oil and wetting agent is available for the use of workers who are affected with dermatitis or with defatted skins. In this way workers whose skins are not affected by ordinary cleansers have their choice of using this mixture or other ordinary cleansers.

References:

1. LANE, C. GUY, and BLANK, IRVIN H.: Sulfonated oil as a detergent for diseases of the skin. *Arch. Dermat. & Syph.*, 43:435 (March, 1941).

2. Tersus, the proprietary name of a wetting agent first made in Germany, has been used for many years for the treatment of skin diseases and as a soap substitute.

3. DUEMLING, WERNER W.: Wetting Agents. *Arch. Dermat. & Syph.*, 43:264-278 (February, 1941).

4. There are many other wetting agents which may also be satisfactory. The following is a partial list of their trade names: Duponol, Gardinol, Alkanol, Merpol, Avirol, Nekal, Naccanol, Aerosol, Decerosol, Santomerse, Igepon, Triton, Orthopol, and Tergitol.

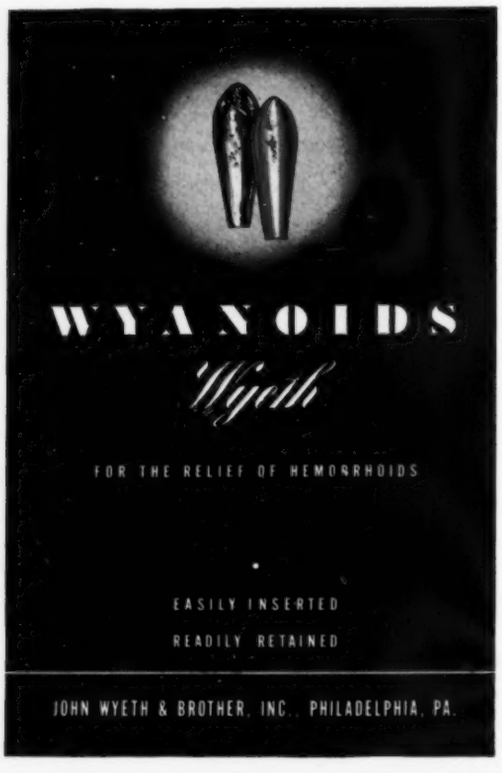
Cancer in Industry

CANCEROUS changes in the skin may occur in wounds or scars caused by industrial accidents, such as burns and wounds. Cancerous degeneration also occurs in so-called sailors' and farmers' skins, supposedly due to over-exposure to the ultra-violet rays of the sun. Radium and x-ray cancers among technicians and physicians you are familiar with. Certain chemicals are also said to cause cancer of the skin. The soot cancer of chimney sweeps, described in England, has not been described in America. Coal tar, certain oils and petroleum products predispose to the development of cancer. In studies in oil refineries, Schwartz has verified this fact. Workers in arsenic also tend to develop keratotic lesions on the exposed parts. Such lesions have been reported by European observers, but in our studies in factories where arsenical insecticides are manufactured, we have failed to note their occurrence. We have, however, seen such lesions occurring as a result of the internal administration of arsenic over long periods of time.

An unusual number of papillomata and carcinomata of the bladder has been found to occur among synthetic dye workers both in Europe and in America.

Workers exposed to such dye bases as anthracene, benzedin and alphanaphtylamine, are said to have cancers of the bladder occurring among them 30 times more frequently than the average population.

Aniline and its derivatives are also said to cause the occurrence of cancer. Cancers of the liver have been experimentally produced in rats by feeding them certain aniline dyes, amido azotoluene and also by rubbing certain of these aniline dyes into wounds of the skin. Other substances said to cause cancer are toluidin, xylol, xyloidin, cumidin, anisidin, dyphenylamin, naphthol, Kongo-red, safranin, benzoepurpurin and blue-rosanilin.—From "Contact Dermatitis, Occupational Importance, Diagnosis, Management, Prevention," by CLEVELAND WHITE, M.D., in *Mississippi Valley M. J.*, September, 1941.



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MANUFACTURERS

Foodex

SCIENTIFIC NUTRITION CORPORATION, Bloomfield, New Jersey, is introducing to the industrial medical field its new food product which complies in all essential respects with the ideal form for a supplementary food as established by Haggard and Greenberg, whose ideal requirements in this respect are published elsewhere in these pages.

The new product is called FOODEX. It is a concentrated food which contains in a single portion (1 vitamin and 1 mineral cake) the 17 daily nutritional musts—nine vitamins and eight minerals — in potencies and amounts that supply most of the vitamins and minerals in excess of the daily minimum requirements together with goodly amounts of the natural B complex from four rich sources; yeast, wheat germ, rice polish, and dry defatted milk. FOODEX requires no preparation. It is easily digested and its chocolate flavor has a wide range of taste appeal. Each daily portion is separately packaged in a plastic container, which protects vitamins against oxidation and the product against spoilage and contamination. It also contains 100 calories of quickly available energy.

Health Supply Chief

WILLIAM M. BRISTOL, JR., Vice-President and director of Bristol-Myers Company, has been appointed chief of the Health Supply unit of the purchasing division of the Office of Production Management in Washington. All drug industry problems pass through the Health Supplies section of OPM. Mr. Bristol will administer the health supplies rating plan of OPM under which high priority ratings are given to users of bulk medicinal chemicals and other drug products in order to keep production up without affecting individual pharmaceutical or proprietary drug manufacturers.

M.S.A. Ear Defenders

MINE SAFETY APPLIANCES COMPANY announces a new product —the M.S.A. Ear Defenders. These reduce loud noises by 35 to 45 decibels, or to about 10% of their former loudness, yet are so designed that warning signals and conversation can easily be heard. The effect from the reduction of noise is the marked reduction of the fatigue, irritability, and nervous exhaustion experienced by workers in and about noisy operations. The new Ear Defenders are the result of long research and experiment by DR. VERN O. KNUDSON, Professor of Physics at the University of California at Los Angeles, and DR. CAREY P. MCCORD, Medical Director, Industrial Health Conservancy Laboratories, Detroit. Each Defender is a tapered tube molded from a surgical-type soft rubber, consisting of two barriers, the outer one of metal, and the inner one of soft rubber, separated by an air space. The construction permits the insertion and removal without any danger of coming in contact with the ear drums. Unlike other forms of protection for noise which must be discarded after use, the new Defender can be easily cleaned with soap and water and used continually. The bulletin describing these Defenders in detail may be secured on request from Mine Safety Appliances Company, Braddock, Thomas and Meade Streets, Pittsburgh, Pennsylvania.

Not Nazi

IN CASE publication of the fact that the government has proceeded against the Sterling Products, Inc., of Wheeling, West Virginia, for Nazi affiliations might cause anyone to confuse the STERLING PRODUCTS CORPORATION, 333 Fourth Avenue, New York City, with the suspected company, we quote, on behalf of STERLING PRODUCTS CORPORATION of New York, as follows: "This company has not and never has had any connection whatsoever with that concern (Sterling Products, Inc., of Wheeling, West Virginia) and it is merely our misfortune that the names are similar."

Nutrition

SEVERAL months ago, Vitex Laboratories, of Harrison, New Jersey, put out a pamphlet entitled "Milk in Industry." Some of the quotations used in its text are particularly interesting in view of the large amount of thought and attention being given to nutrition as an aid to efficiency.

"Haggard and Greenburg have recently reported a controlled study of the effects of between meal feedings of bananas or milk and bananas during previously established rest periods on the disposition and absenteeism of a group of 120 clerical workers in a large commercial office. There was a marked decrease in absenteeism among the employees receiving these two daily supplementary lunches. Most of the employees approved of the supplementary food and thought that they became less tired and were kept in better spirits and were more attentive to their work."

—(Haggard and Greenberg, *J. Am. Dietetic Assn.*, June-July, 1939.)

Comstock and Eddy have reported a study on the effect of a supplementary rest period luncheon on industrial absenteeism. The supplementary luncheon consisted of one banana and a half-pint of milk at each of two rest periods daily. These investigators report definite benefit in the reduction of absence from illness, as a result of this dietary improvement.

—(Comstock and Eddy, *J. Am. Dietetic Assn.*, September, 1935.)

Holmes et al in 1932 studied the effect on time lost by workers, through sickness, of supplementing the home dietary with one tablespoon daily per person of cod liver oil assaying at more than 1000 units of vitamin A and more than 130 units of vitamin D per gram.

They were most particularly interested in decreasing the incidence of the common cold. One hundred and eighty-five persons served as subjects, of which 115 were women and 70 men. Thirty-four per cent of the subjects were office workers, 27.6% worked with "light" machines, 38.4% with heavy machines. The experimental period covered the consecutive months of December, January, February and March.

The same authors report that the number of hours of absence per person during the experiment was 12.8 for the cod liver oil group and 25.1 for the control group, as compared with 20.4 hours and 17.4 hours for the experimental and control groups respectively, during the previous year when no cod liver oil supplements were fed.

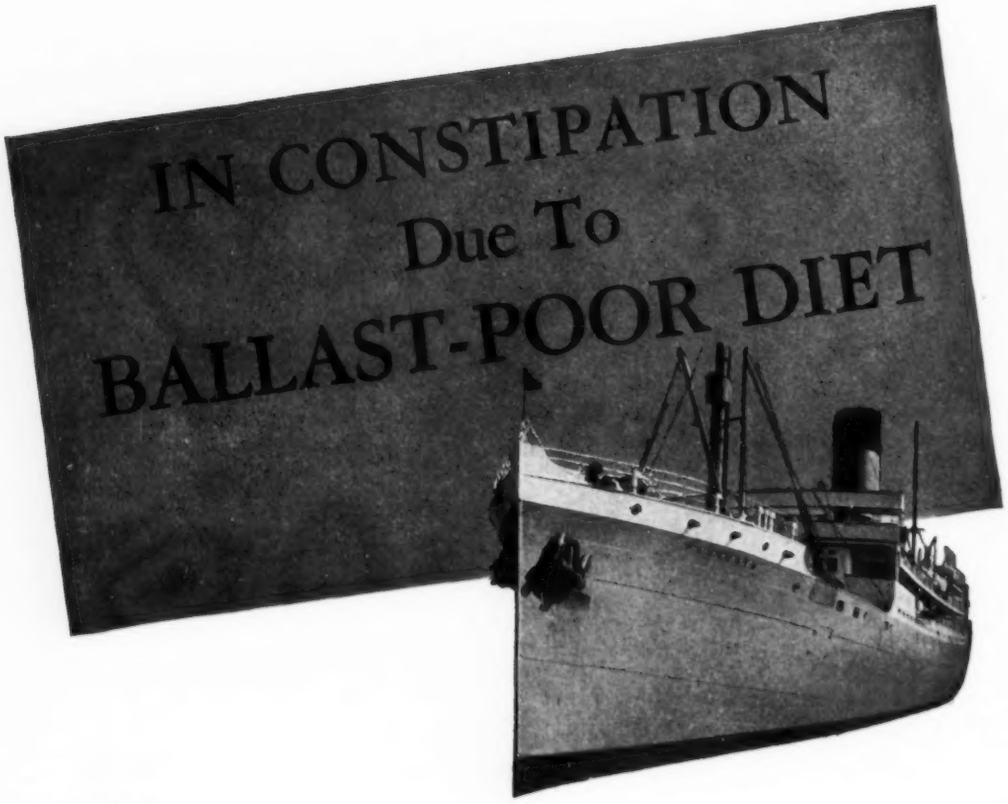
—(Holmes, Comstock et al, *Indust. & Eng. Chem.*, September, 1932.)

"From the standpoint of health, better diets could mean smaller outlays for illness, less loss of working time, greater physical efficiency, and longer, more productive life."

—(Stiebeling, page 381, "Food and Life," *Dept. Agricul. Yearbook*, 1939.)

"These same investigators (Haggard and Greenburg) have described a study of between meal feedings made in a large industrial plant manufacturing rubber footwear. They selected from a series of unit operations that of sewing together (by machine) the canvas parts of the tops of tennis shoes. Rows of operators could take from a conveyor belt, as needed, baskets filled with unassembled tops, sew them together and replace the baskets together with a slip giving the operator's number. The wage system provided a minimum hourly wage plus an additional sum based on rate of production. The hourly production of the individual operators was recorded from the number of assembled shoe tops returned to the baskets placed on the conveyor. A sustained hourly rate of production was strikingly apparent for operators accustomed to eating food in the third hour of the morning and afternoon working periods (five meals in all) as compared with those eating only two or three meals a day. The productivity of another group of operators accustomed to three meals a day improved very significantly when given, in addition, light lunches of milk and 'angel' cake at the beginning of the third hour of the morning and afternoon working periods. The operators also volunteered the information that they felt less tired on those days when they have five rather than three meals."

—(Haggard and Greenburg, "Diet and Physical Efficiency," Yale University Press, 1935. Reviewed by Dr. Lela E. Booher in her article "Adequate Nutrition for the Industrial Worker," *J. A.M.A.*, February 17, 1940)



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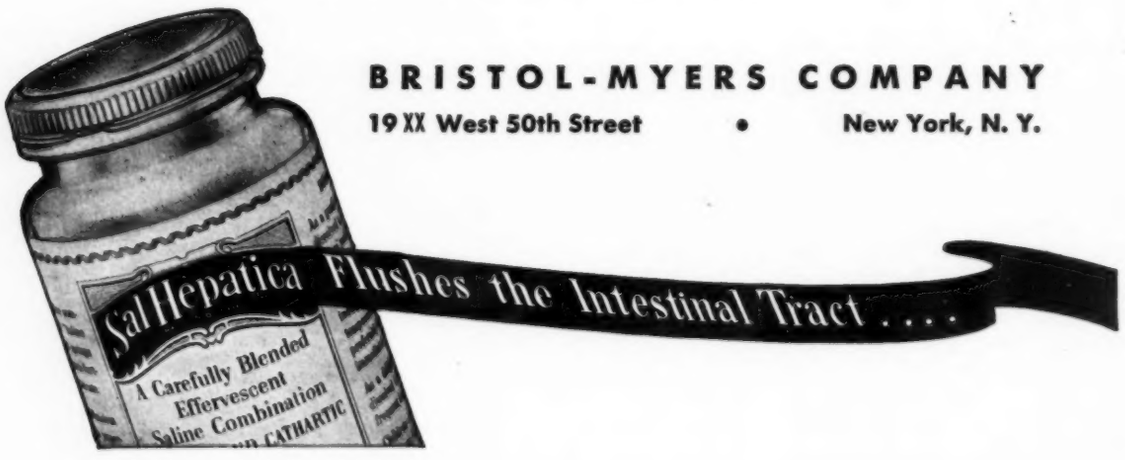

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GENERAL

—*Continued from page 17*

potency of gramicidin is shown by the fact that one gamma, or one thousandth of a milligram, will stop the growth of virulent streptococcus and pneumonia germs in tissues. One milligram is the equivalent of slightly more than one hundredth of a grain. The strongest concentration used in treating patients at the Mayo Clinic was 400 gamma per cubic centimeter.—*Science.*

Industrial Hygiene Bureau

THE LOS ANGELES COUNTY DEPARTMENT of Health has established a bureau of industrial hygiene. Dr. Hugh E. Dierker, Jr., and Mr. Frank Stead, an engineer, have been named to the staff. The Division of Industrial Hygiene of the National Institute of Health, Washington, D. C., will lend a chemist to the new bureau.

Industrial Hygiene Course

A TWELVE-week course in industrial hygiene opened October 27 at the University of Pennsylvania to continue through January 17, under the auspices of the engineering, science and management defense training program of the U. S. Office of Education; it is open to graduates in engineering, chemistry or allied sciences. Additional information may be obtained from Theodore Hatch, M.S., associate professor of industrial hygiene, department of public health and preventive medicine, University of Pennsylvania School of Medicine.

Rock Island Railway Surgeons

THE SURGICAL ASSOCIATION OF THE ROCK ISLAND LINES will hold its Annual Meeting November 13 and 14, 1941, at the Muehlbach Hotel, Kansas City, Missouri.

Panel

THE secretary of the California State Federation of Labor recently sent a letter to the California Medical Association asking for consideration of the formulation and supervision of a panel of industrial physicians to handle compensation patients. At present the physicians are chosen by the insurance carrier. The whole question is influenced, according to an editorial in the June 19 issue of the bulletin of the Los Angeles County Medical Association, by the fact that bills now pending in the California state legislature to permit free choice of physicians by appointment would, under the present regulation of medical practice in California, admit to such practice all the various cultist practitioners now licensed in that state. The Committee on Industrial Contract and Insurance Practice of the California Medical Association has urged the association strongly to appoint a committee to meet the representatives of the California State Federation of Labor with a view toward achieving a mutual satisfactory solution.—*J.A.M.A.*, October 11, 1941.

Iowa Institutes

THE last of the 10 special institutes on industrial health under the sponsorship of the Iowa State Medical Society and the Iowa State Department of Health, five of which were held in June and four in September at various key cities, will be held at Davenport, December 2, 1941.

The Executive Viewpoint

THE ASSOCIATION FOR THE ADVANCEMENT OF INDUSTRIAL MEDICINE AND SURGERY held its 1941 Annual Dinner in New York, October 23, attended by about 300. JOHN J. PORTER, President, North America Cement Corporation, spoke on "Industrial Safety and Health from the Executive Viewpoint." The subject matter of this address will be published in a later issue.

A Natural

THE National Safety Council Industrial News Letter, referring to the title of a poster put out by the Borden Company, on giving first aid for minor injuries, quotes as follows: "Start from Scratch," and then observes: "If this isn't a natural, we never saw one."

Miscellaneous

T. M. GIRDLER, Republic Steel chairman, told the National Safety Council: "Someone has calculated that in the last war every soldier needed about four men behind the lines to provide him with supplies. In this war, the number is from 15 to 18 men behind the lines to supply each fighter." . . . ITEM from American Iron and Steel Institute, via AP: "The second melter on an open hearth furnace was troubled by the itch. His doctor told him he was allergic to the pitch used as the inner coating of steel ingot molds; had 'pitch itch.' The steel company's metallurgist substituted caramel made of corn sugar for the pitch, and the itch quit itching." . . . A WRITER in *Collier's:* "Lip sores are the occupational disease of a trumpeter." . . . SPECIAL, from Weehawken, New Jersey: "A linoleum worker who long has been the victim of indigestion was resting comfortably in a hospital here today after surgeons had removed 410 1¼-inch keenly pointed linoleum nails from his stomach during a 90-minute operation." . . . FATAL O. D. in the classics: *"First Clown:* 'A tanner will last you nine year.' *Hamlet:* Why he more than another?' *First Clown:* 'Why, sir, his hide is so tanned with his trade that a' will keep out water a great while.' "

The Twenty-Seventh (1942) Annual Meeting of the American Association of Industrial Physicians and Surgeons and the Third (1942) Annual Meeting of the American Industrial Hygiene Association will be held at Cincinnati, Ohio, April 13-17, 1942.

LETTERS

To the Editors:

I was very much interested in reading the article by DR TAYLOR and DR. ALEXANDER about silicosis, and silicosis with tuberculosis in the September issue of INDUSTRIAL MEDICINE. I was glad to note that they quote with approval the researches of DR. GARDNER in our industry, as evidence of the fact that dusts other than free silica could not cause silicosis.

Another characteristic of cement dust, its absorptive quality, helps to explain the absence of pathologic effect from its inhalation. This characteristic is not particularly stressed by DR. GARDNER but has been mentioned in the publications of the U. S. Public Health Service. Experiments by DRS. MILLER and SAYERS with peritoneal injections have shown that portland cement dust, in contrast with quartz and coal, rapidly disappears, leaving the peritoneal tissue undamaged. These researches were first published in 1934, 1935 and 1936, and were summarized in the February 14, 1941, issue of Public Health Reports.

There is one point in the paper by DRS. TAYLOR and ALEXANDER which might be clarified somewhat. They have given two analyses for portland cement, the component and compound, but have indicated that the component analysis is an analysis of the uncombined raw materials. Actually this analysis is always made on finished cement, and is merely a statement of the proportions of the different elements in portland cement in terms of their oxides. From this component analysis the actual compounds are calculated mathematically.

It is seldom that the raw materials from which portland cement is manufactured contain as much as 20% free silica. On page 282 of GARDNER'S report, the following statement is made:

"From this summary it is obvious that the raw materials other than limestone may contain considerable proportions of free silica. Such materials, however, are usually ground with the limestone so that the free silica content of the mixture is relatively low. For ordinary cements they never exceed 12.0% of the mix and they average 6.6%.

The remaining 8 to 14% of silica in the finished cement is found in combined form in the various argillaceous materials added to the limestone before calcining.

—A. J. R. CURTIS, Assistant to General Manager, Portland Cement Association.

To *EXPERIENCE* is to *KNOW*

Female: Gas explosion causing first degree burns upper portion back, right side neck and upper portion arms; second degree burns lower forearms and hands. **(A)** Admitted February 12th, 1941. **(B)** Healing well advanced February 28th. **(C)** Discharged March 7th with no evidence of any permanent scarring contractures. Photo taken July 5th. Detailed case history upon request.

FOILLE
EMULSION
Analgesic—Antiseptic

When, through repeated clinical trials, critically you observe what FOILLE treatment accomplishes, you can form sound opinion from the combination of acquired knowledge and revealing experience. That is the measuring stick of all progress.

Nation-wide clinical opinion formed in three short years of medical experience, gives FOILLE a ranking position in burn therapies because of its apparent ability to:

—dramatically control pain ***—shorten convalescent period***
—consistently avoid sepsis ***—lessen scarring contractures***

Clinical sample and literature sent upon request

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